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VOL. 55—No. 1 APRIL, 1919

THE VEHICLE MONTHLY

FOR 54 YEARS THE VEHICLE MANUFACTURERS' MAGAZINE

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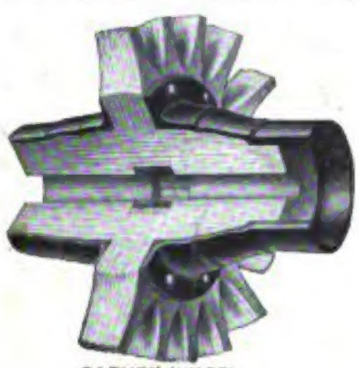
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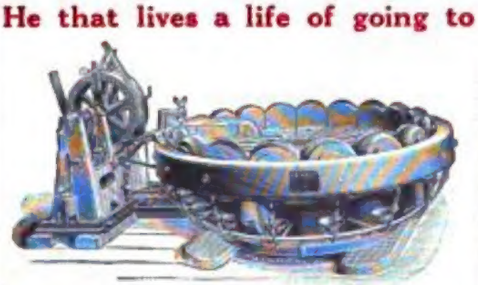
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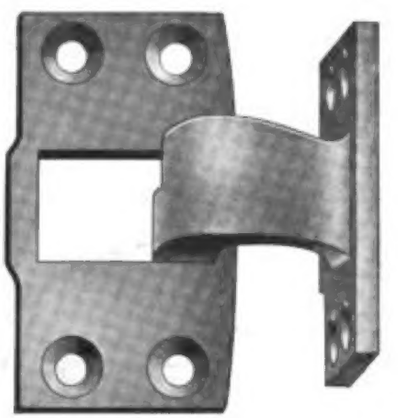
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OUR advertising manager wrote a note to Mr. Overman asking what he desired to say in the vehicle journals concerning the peace-time line up of our organization.

And Mr. Overman Replied:

This is in response to yours of the 13th.

To facilitate our changing from military conditions to a civil or peace basis, our company has appointed me General Manager of our plants at Connersville, Ind., and Wheeling, W. Va. I will also, as heretofore, be in charge of sales of vehicle springs and axles. My headquarters will be Suite 423-424 Union Central Bldg., 4th and Vine Sts., Cincinnati, Ohio.

This promotion is a source of gratification to me for many reasons. I have been connected with the vehicle industry for more than thirty years. Nearly every man engaged in that line is personally known to me and I believe most of them are my intimate friends.

When I came to Cleveland, about one and a half years since, the war was at its worst. Steel and all materials necessary to my lines were scarce and difficult to procure at any price. All my energy was concentrated on making our company realize the importance of securing these materials, even regardless of cost. It is gratifying to be able to say that they certainly did all it was possible to do.

Now, friend Braden, you have our publicity matters in charge. I want the trade to know my address and I desire you to impress them with the fact that we are enlarging and improving our equipment for the manufacture of vehicle products. I promise them good, up-to-date, prompt service in every respect.

Mr. Charles Heflinger, with headquarters at Norfolk, Va., will continue to look after our interests in the South. His long experience as a vehicle builder equips him with an intimate knowledge of all vehicle problems.

Mr. Earl M. Hunker will assist me in manufacture, and sales in the North. From boyhood he has been continuously employed in various capacities in our Canton plant and is familiar with all features of the vehicle lines.

With these facts before you, I hope you will assist me to acquaint the trade fully of these changes.

Yours truly,

E. V. OVERMAN,
General Manager.

And the advertising manager believes Mr. Overman has stated the case rather better than he could have done and prints the above accordingly.

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Executive Offices:
CLEVELAND, OHIO

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Union Central Bldg., Cincinnati, Ohio

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THE VEHICLE MONTHLY

PUBLISHED FOR 54 YEARS AS

THE MAGAZINE FOR VEHICLE MANUFACTURERS

Published Monthly by
WARE BROS. COMPANY, PUBLISHERS AND PROPRIETORS.
1010 ARCH STREET, PHILADELPHIA, PA.

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Advertising rates will be furnished on application. Copy for advertisements should reach us not later than the tenth of the month to insure insertion in the following issue. Changes in advertisements should reach us not later than the tenth of each month.

THE VEHICLE MONTHLY is a member of the A. B. C.

Vol. 55, No. 1 **PHILADELPHIA, APRIL, 1919** **Subscription Price $2.00 Per Year**

Disposal of German Army Vehicles

Owing to the important part played by motor vehicles in the military operations and the large numbers of such vehicles purchased by the governments of the belligerent countries, the automobile industry has been most vitally interested in the methods that were to be adopted by the various governments for the disposal of the surplus vehicles after the termination of hostilities.

In Germany, where an early end of the war was generally expected, 20 automobile manufacturers organized in 1915 a special company (Feldkraftwagen Aktien-Geselilschaft, or Feldag) for the purpose of taking over the motor vehicles released by the army and disposing of them with as little disturbance as possible to the automobile industry. It was generally expected that the automobile market would be flooded after the war.

According to an article in the Frankfurter Zeitung for December 20, 1918, of which the present is a summary, there is not the slightest danger of any immediate flooding of the market, in view of the scarcity of repair parts.

Even in the case of passenger vehicles, the present supply, especially of the lighter models, is far below the demand, and sales are now restricted to customers who need the vehicles for the performance of their professional duties, such as physicians and veterinarians.

The apprehended drop in prices has failed to materialize, especially in the case of commercial vehicles. A three-ton truck, which sold for about 16,500 marks ($3,927) before the war and which may now be obtained for not less than 30,000 marks, with tires of iron and wood, is now sold by the Feldag, after a thorough overhauling, for 12,000 to 14,000 marks. The fact that army contracts for about 10,000 trucks are still outstanding has also a steadying effect on the market.

Under the circumstances it is not surprising that private firms find it difficult to purchase trucks at reasonable prices. It is recalled that a few months ago the association of automobile manufacturers decided to annul all private orders for vehicles received prior to December 31, 1916, on account of the abnormal increase in wages and materials.

While orders are again being accepted by manufacturers, the scarcity of raw materials and the general uncertain conditions make it necessary for them to stipulate a delivery period of several years and to protect themselves thoroughly in regard to prices.

Prior to the war, it is estimated, Germany had probably about 7,000 to 8,000 trucks in use. At the outbreak of the war most of them were taken over by the army, and during the war only about 2,000 to 3,000 vehicles assigned to the home forces were available partly for public and partly for private use.

An increase through return of army trucks is not to be expected, in view of the fact that their number was much smaller than it was generally anticipated and also because of the armistice provision for the surrender of 5,000 trucks to the Entente.

Steaming of Vehicle Stock in Drying

Saturated steam as a means of alleviating the tendencies of green lumber to honeycomb in the kiln has for some time been successfully applied in the commercial drying of heavy vehicle stock. Under intelligent control, such treatment has meant the difference between success and failure in many kiln runs. It has frequently afforded the means of overcoming discrepancies in operation or misjudgments as to the ability of stock to withstand rigid drying conditions.

So far, however, the steaming treatment has been confined to straight stock. The contention has always been that bent stock, such as rims, should not be steamed after removal from the form, experience indicating that stock so treated would tend to straighten out to its original shape. The kiln drying of heavy bent rims has been carried on, therefore, without resorting to steaming to remove casehardening and other defects.

Recent experiments conducted under the direction of the Forest Products Laboratory have shown that judicious steaming of heavy bent vehicle stock results in a considerably improved product, and that the operation can be accomplished without serious effect upon the curvature. Careful judgment is necessary, however, as it is a very easy matter to ruin the entire charge by too severe treatment. Contrary to the common impression, this steaming has been done at high temperatures (150° to 180° F.) and for short periods one-half to three hours, the temperature and time varying according to the requirement of the case.

The method was given a rather severe test, being tried first on 56-inch oak rims and later on 60-inch artillery wheel stock. When applied to the kiln drying of heavy oak rims on a commercial basis, it worked out very successfully. Checks in the stock before steaming, which showed "pinching in" tending toward honeycombing, closed normally without further damage after steaming. From kiln charges totaling about 2,400 pieces, the losses attributable to kiln drying were only 2 per cent.

Trade Opportunities in Poland

Poland is undoubtedly one of the greatest future markets of the world. The present situation in Poland is most encouraging; all advices indicate that, as soon as the monetary system is finally settled upon, commerce with the outer world soon will be undertaken on a large scale. This will mean the regeneration of the commercial, industrial and agricultural activities of Poland; and to attain this Poland must have from the United States vast amounts of shoes, clothing, motor trucks, tractors, machines, implements, tools and raw materials. Much of this material will be purchased as emergency matter directly through the Polish Government, but a vast amount will be sought by intelligent purchasers who are now arranging for the necessary credits in the United States.

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Motor Trucks and Highway Legislation

There are three main parties in the controversy with respect to motor trucks and their relation to the highways.

First, there are extremists who argue that all the truck has achieved for civilization does not compensate for its damage to the highways. Their only panacea is ruthlessly to legislate the power vehicle from the highways.

Second come those who stand to defend the motor truck, who are willing that it should bear a proper financial burden for the uses of the roads, and who are willing to deal in a spirit of compromise on the question of weight and speed.

Between these radicals is a third class which stands for compromise. These concede the place of the truck and believe that roads should be built adequate for it. But they insist that until better roads are obtainable, the present highways must be protected, even though in the process it becomes necessary to impose restrictions on trucks.

As a basic proposition highways should be the servant of transportation, not its master.

The truck has made its place. It has proved its adaptability to modern transportation problems. Civilization will lose unless means be found for its expanding application. Restrictions, prejudices and petty objections must not be permitted to stand in its way.

Traffic Must be Diverted to the Highways

Those who admit no place for the truck stand opposed to the spirit of the times. They are putting themselves in opposition to cabinet officers, the railroad administration, the food administration, the War Industries Board, the National Highways Council, the Electric Railways' War Board, the Army, the United States Senate, and even the President of the United States, all of whom have approved of and co-operated with the efforts of the Highways Transport Committee to divert all possible traffic to the highways.

Those legislators who vote against trucks, feeling that they are serving the interest of the farmer, should be reminded that actually they are working against the pocketbook of the farmer. It is a fact not yet generally known that haulage of farm product by motor truck is cheaper than haulage by team.

This statement has the support of authoritative figures presented by Frank Andrews, of the Bureau of Crop Estimates, of the Department of Agriculture. He quotes 1918 figures to show the estimated cost of hauling in wagons from farm to shipping point as compared with motor truck haulage costs per ton mile to be as follows:

	Horse and Team	Truck
Wheat	$ .30	$ .15
Corn	.33	.15
Cotton	.48	.18

Motor truck costs now are lower than were wagon costs in 1906, a result due to increased efficiency of the motor truck.

Motor truck hauls in 1918 from farm to shipping point averaged 11.3 miles, while wagon hauls averaged 9 miles; and a motor truck made 3.4 round trips per day over its longer route of 11.3 miles, while wagons made 1.2 round trips per day over the 9-mile distance.

Foremost men of the industry, recognizing the difficulties involved, have given close thought to the question of dimensions. Frequent meetings held in Washington have discussed the question in detail. Compromises and adjustments have been made to achieve a combination of necessary fundamentals, equitable legislation, efficient administration and proper construction.

Suggested Motor Truck Restrictions

(Published by the National Motor Truck Committee of the National Automobile Chamber of Commerce)

Height and width are not the major problems with which we must deal. They can speedily be eliminated.

Nobody is going to build a truck body so high that it will not go under bridges. Neither will anybody make a body so wide that it cannot be moved through city streets between the car track and curb, and over country highways where two vehicles have to pass.

Occasionally trucks are piled up with loads that project at the sides and tower over the top. Preventing such loads from becoming a nuisance or a menace is largely a matter for local regulation. It is not a matter that concerns the manufacturer. He can control the dimensions of chassis and body. Loads are beyond his province.

We have fixed on 12 feet 2 inches as the utmost distance between road and the summit of the body, and 96 inches as the greatest width of the body. We do not think these figures should be exceeded and would cheerfully bow to laws so decreeing.

When it comes to weight and speed there is much more to contend with.

It is not to be denied that the truck constantly grows in weight—moreover, if unrestrained, it steps faster all the time.

The heavily weighted truck, running on solid tires and covering the highways at a stiff rate of speed, deals undoubted damage. But it is not to be forgotten that both this weight and speed serve a highly practical purpose. The cost of carrying the load decreases in proportion to the number of tons carried.

As a general proposition it may be stated that as the size of the truck increases, the cost of operation in relation to carrying capacity decreases. There are four principal reasons for this:

1. The cost of manufacture of a truck does not increase in proportion to the carrying capacity.

2. The so-called fixed charge, or overhead operation, does not increase in proportion to carrying capacity.

3. The actual operation cost does not increase in proportion to carrying capacity.

4. The weight of the truck itself does not increase in proportion to carrying capacity.

From an economic standpoint this is a most important consideration. Truck owners have a right to operate their trucks to the highest limit of economy and efficiency. They should be permitted to run the heaviest possible truck made necessary by their haulage problems, and roads should be made equal to the burden as speedily as possible. To take any other position is to legislate directly against an increasing army of motor truck users.

There are not less than 550,000 trucks in use in the United States. It has been estimated that farmers alone will apply to the highways 2,000,000 more trucks within the next ten years. The possibilities in all other lines of activity are so many and so varied that the whole subject of truck legislation must be approached with justice and vision.

The plan for uniform truck law calls for permission to operate a vehicle whose gross load is 28,000 pounds. It also provides that the Highway Commissioner can reduce this limit to 24,000 pounds, where it can be shown that roads will not stand more than this weight. He also has the option of increasing above 28,000 pounds, where highly improved roads make this possible.

The load per inch width of tire was, after due consideration, fixed at 800 pounds throughout, whether solid or pneumatic tires be used.

For vehicles of less than 6,000 pounds gross weight, including vehicle and load—in other words, passenger automobiles or very light commercial vehicles—a maximum speed of 30 miles per hour is permitted in the open country. This may be exceeded for a quarter of a mile in order to permit one vehicle to pass another. Twenty miles an hour is permitted through suburban sections, villages and towns, and 15 miles maximum in thickly built-up parts of cities and towns.

Pneumatic tired vehicles are arranged in a classification that goes all the way from 6,000 to 28,000 pounds gross weight.

Practical Speeds

The speed for the entire classification of pneumatic tired vehicles has been made uniform at 25 miles in the open country, 20 miles in suburban sections and 15 miles in congested sections.

The next classification brings us to the trucks using solid tires. The lowest gross weight provided for is 4,000 pounds, the highest is 28,000 pounds. Through thickly populated sections none of these vehicles is permitted to go faster than 12 miles per hour, except the 4,000-pound, which may run up to 15. In suburban sections they are all limited to a speed of 15 miles per hour, excepting the 8,000-pound vehicle, which may go up to 18, and the 4,000-pound vehicle, which may run up to 20.

In the opening country the regulation is as follows:

4,000-lb. vehicle	25 miles
8,000-lb. vehicle	20 miles
12,000-lb. vehicle	18 miles

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16,000-lb. vehicle.....16 miles
and the remainder.....15 miles

Class "D" comprises motor vehicles for the purpose of transporting passengers for hire upon any of the public highways.

First for vehicles of less than 6,000 pounds, which are permitted 30, 20 and 15 miles per hour, according to sections.

The 7,000-pound vehicle is permitted 30, 20 and 12 miles according to section.

Classification of Motor Trucks (See Table)

The vehicles referred to in the table annexed are classified as follows:

Class A—Motor vehicles equipped with all pneumatic tires and not exceeding six thousand (6,000) pounds in weight, including weight of vehicle and load.

Class B—Motor vehicles equipped with all pneumatic tires, and exceeding six thousand (6,000) pounds in weight, including gross weight of vehicle and load.

Class C—Motor vehicles equipped with two or more solid tires.

Class D—Motor vehicles used for the purpose of transporting persons for hire upon any of the public highways of the State.

Class E—Motorcycles.

Class F—Solid rubber or pneumatic tire trailer or semi-trailer pulled or propelled by a motor vehicle.

Class G—Traction engine, tractor, or other similar vehicle used for motive power only without carrying any load or portion thereof on the tractor itself. No registration is required for binders and other similar farming implements not designed for hauling purposes.

Class H—Vehicles propelled by electric power.

SUMMARY OF MOTOR TRUCK DIMENSIONS

	Maximum speed, open country—30 miles and no greater speed shall be maintained for a distance exceeding ½ of a mile in length.	Maximum speed through suburban sections, villages and towns.	Maximum speed in thickly built up parts of cities and towns.	Maximum weight, including gross weight vehicle and load.	Load per inch width of tire measured between flanges
A	30 miles	20 miles	15 miles	6,000 lbs.	
B	25 "	20 "	15 "	6,000 "	800 lbs.
"	25 "	20 "	15 "	8,000 "	800 "
"	25 "	20 "	15 "	12,000 "	800 "
"	25 "	20 "	15 "	16,000 "	800 "
"	25 "	20 "	15 "	20,000 "	800 "
"	25 "	20 "	15 "	24,000 "	800 "
"	25 "	20 "	15 "	28,000 "	800 "
C	25 "	20 "	15 "	4,000 "	800 "
"	20 "	18 "	12 "	8,000 "	800 "
"	18 "	15 "	12 "	12,000 "	800 "
"	16 "	15 "	12 "	16,000 "	800 "
"	15 "	15 "	12 "	20,000 "	800 "
"	15 "	15 "	12 "	24,000 "	800 "
"	15 "	15 "	12 "	28,000 "	800 "
D	30 "	20 "	15 "	6,000 "	800 "
"	30 "	20 "	12 "	7,000 "	800 "
"	30 "	20 "	12 "	8,000 "	800 "
E	30 "	20 "	15 "		
F	.....	.....	.....	4,000 "	800 "
"	.....	.....	.....	8,000 "	800 "
"	.....	.....	.....	12,000 "	800 "
"	.....	.....	.....	16,000 "	800 "
"	.....	.....	.....	20,000 "	800 "
"	.....	.....	.....	24,000 "	800 "
"	.....	.....	.....	28,000 "	800 "
"	For iron tire trailers or semi-trailers, double the above rate for Class F.				
"	For pneumatic tire trailers or semi-trailers, three-quarters of the above rate for Class F.				
H	Two-thirds of the fee charged gasoline vehicles of equal weight.				

The third class calls for 8,000-pound vehicles, and is permitted 30, 20 and 12 miles per hour.

The "E" class, motorcycles, calls for no particular comment.

In the "F" class are comprised all solid rubber or pneumatic tired vehicles trailed or propelled by motor vehicles. The speed permitted to the propelling motor vehicle naturally regulates the speed of the trailer. The pounds per inch of tire remain unchanged at 800. The weights run from 4,000 to 28,000 pounds as in case of solid tired trucks.

In case of trailers that carry pneumatic tires the rate is reduced to three-quarters. It is doubled for iron tire trailers or semi-trailers.

In order to deal with possible overloading, penalty should be prescribed where any truck carries more than the gross weight shown on the plate attached by the manufacturer.

Hints on Storing Timber to Prevent Decay

Many serious losses from decay in wooden structures are possibly due to the fact that the timbers used were infected with wood-destroying fungi while in storage. These losses can be greatly reduced by keeping lumber storage yards in a sanitary condition. Some hints as to how to do this are given below:

Store on Well-Drained Ground

Strong efforts should be made to store the product on well-drained ground, removed from the possible dangers of floods, high tides, and standing water.

Remove Debris and Keep Down Weeds

All rotting debris scattered about yards should be collected and burned, no matter whether it be decayed foundation and tramway timbers or stored lumber which has become infected. In the case of yards already filled in to considerable depths with sawdust and other woody debris the situation can be improved by a heavy surfacing with soil, slag, or similar material. Weeds should be cut away from the piles to allow good ventilation.

Use Proper Foundations

More attention should be given to the foundations of lumber piles in order to insure freedom from decay and better ventilation beneath the stacks. Solid foundations should never be used. In humid regions the stock should not be piled less than 18 to 24 inches from the ground. Wood blocking used in direct contact with wet ground should be protected by the application of creosote or other antiseptic oils or else replaced by concrete, brick, or other durable materials. Treated skid timbers would also be highly advantageous.

Slope Lumber Piles

Foundations should be built so that the piles will slope approximately one inch to every foot of length.

Assist Ventilation by Avoiding Close Piling in the Open

In most regions lumber should not be close piled in the open, but should be "stuck" with crossers at least one inch thick. Lateral spacing is also very desirable. Roofing or cover boards on the piles should not be neglected, and should extend over for several inches in front and back.

Take Care of "Stickers"

Instead of throwing the "stickers" about on the ground to become infected with decay, they should be handled carefully, and when not in use piled on sound foundations and kept as dry as possible. If pine, saturated with resin, or the heartwood of such durable species as white oak or red gum be employed the danger of possible infection will be greatly decreased.

Keep Sheds Dry and Well Aired

In storage sheds the necessity for piling higher from the ground is very apparent in many cases. The same remedies apply here

(Continued on page 48)

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Automobile Colors, Undercoatings, Enamels, Color Varnishes, Baking Japans and Varnish

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

III.—REPAIR SHOP SYSTEM

(This series of articles was begun in February, 1919. Back numbers can be obtained from the publishers)

Skilled mechanics and modern equipment are essential to motor car repairshop operation. But unless the two are tied together by an efficient system the resulting operation will not be profitable. For the system shows how much it costs to do each job and enables a price to be set that will make the doing profitable. Furthermore system helps each member of the organization to keep jobs going smoothly and efficiently. But the system chosen must be simple, else following it will become burdensome and a load rather than an aid.

The system herein outlined can be used in the larger shops or modified as necessary for the smaller shops. Any printer can make up the forms, or THE VEHICLE MONTHLY will provide them at a moderate price.

Requirements of a System

The following are, in brief, the things a system should show:

1. What work must be done, shown both to the owner and to the shop.
2. When the work is scheduled for completion.
3. The amount of labor put in on each part of the job.
4. The material and parts used.
5. Assurance that the work is done as authorized.
6. A record for all things for which a charge is made.

The operation of the system is shown in Fig. 1, and the forms used are shown in Figs. 2 to 6 inclusive.

The First Step

The first step when a car enters a station is to find out what work is to be done, and to obtain authorization for that work. In large stations this can best be handled by a receiving inspector, who with the owner or driver goes over the car and fills out form (A), Fig 2. In smaller stations the foreman or proprietor can fill the form.

This form is in two parts: (A) being the original, and (B), Fig. 2, carbon copy on a card. The reverse of the original contains the stores record and invoice space. It is immediately sent to the office after filling out, and placed in a loose leaf binder. The carbon copy is on cardboard, and stays with the car until the job is finished.

Both are numbered serially with the shop order (S. O.) number of the job, and it is to this number that all labor and parts are charged, and the records filed.

The work to be done is listed in the columns, each separate part having a separate number. These operation numbers will be used as described later.

Having agreed with the owner what work is to be done, when it should be completed, and noted all data on the car, as shown in Form (A), the owner signs the original, thus authorizing the work. The stub from the bottom of form (B) is his receipt for the car, and must be turned in at the time the car is delivered.

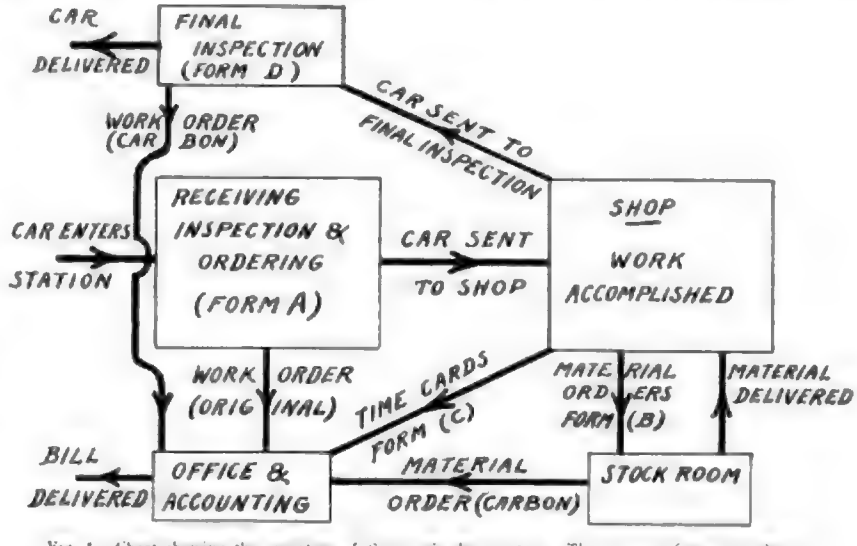


FIG. 1.—Chart showing the operation of the repair shop system. The separate forms are shown in Figs. 2, 3, 4 and 5 respectively.

Shop Records

The car is then turned over to the shop with definite instructions as to the work to be done, and the time promised for completion known. The foreman can then size the job up, pick out his men and get the work going.

Shop Problems

Two problems in the shop, outside of actually getting the work done, are:

(1) To get the material and parts used charged to the job.

(2) To get the labor expended charged to the job.

In doing this, neither the mechanics or the foreman should have to do much clerical work, for that is not their function, and ordinarily they will not do it anyway.

How Material and Parts are Secured

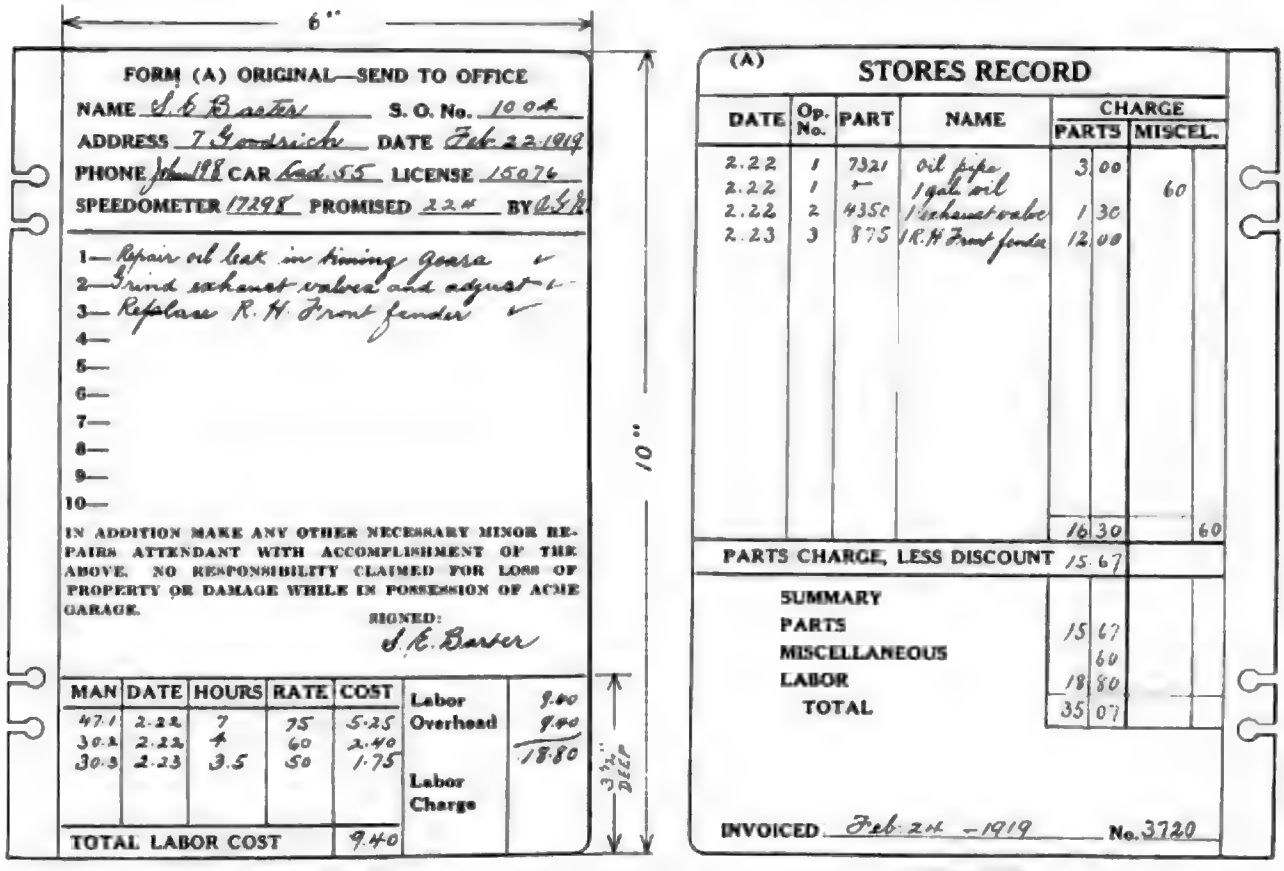
Form B, Fig. 4, shows the material order used to obtain material or parts from the store room. It is made out in duplicate by the workman, checked by the foreman, and sent to the stock keeper, who delivers the part, enters the charge, and forwards the duplicate to the office, where it is entered on the reverse side of form (A). The cost and charge are entered into the cost ledger, and the duplicate filed serially by the S. O. number.

Labor Charges

Time clocks are to be recommended for all shops, as these enable an accurate record of all labor done to be maintained. The clock chosen largely determines the type of time card to be used, but a typical job card is shown in Form (E), Fig. 5.

A separate card is used for each workman, showing his time in, in the morning, and time out at night, but this card is not shown, as it has nothing to do with actually getting the job done. The card of form (C), Fig. 5, is

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FORM (A) ORIGINAL—SEND TO OFFICE

NAME S. E. Baxter S. O. No. 1004
ADDRESS 7 Goodrich DATE Feb. 22. 1919
PHONE Jackson 198 CAR Ford 55 LICENSE 15076
SPEEDOMETER 17298 PROMISED 22nd BY A.S.K.

1— Repair oil leak in timing gears ✓
2— Grind exhaust valves and adjust ✓
3— Replace R. H. Front fender ✓
4—
5—
6—
7—
8—
9—
10—

IN ADDITION MAKE ANY OTHER NECESSARY MINOR REPAIRS ATTENDANT WITH ACCOMPLISHMENT OF THE ABOVE. NO RESPONSIBILITY CLAIMED FOR LOSS OF PROPERTY OR DAMAGE WHILE IN POSSESSION OF ACME GARAGE.

SIGNED: S. E. Baxter

MAN	DATE	HOURS	RATE	COST
47.1	2.22	7	75	5.25
30.2	2.22	4	60	2.40
30.3	2.23	3.5	50	1.75
TOTAL LABOR COST				9.40

Labor	9.00
Overhead	9.40
Labor Charge	18.80

(A) STORES RECORD

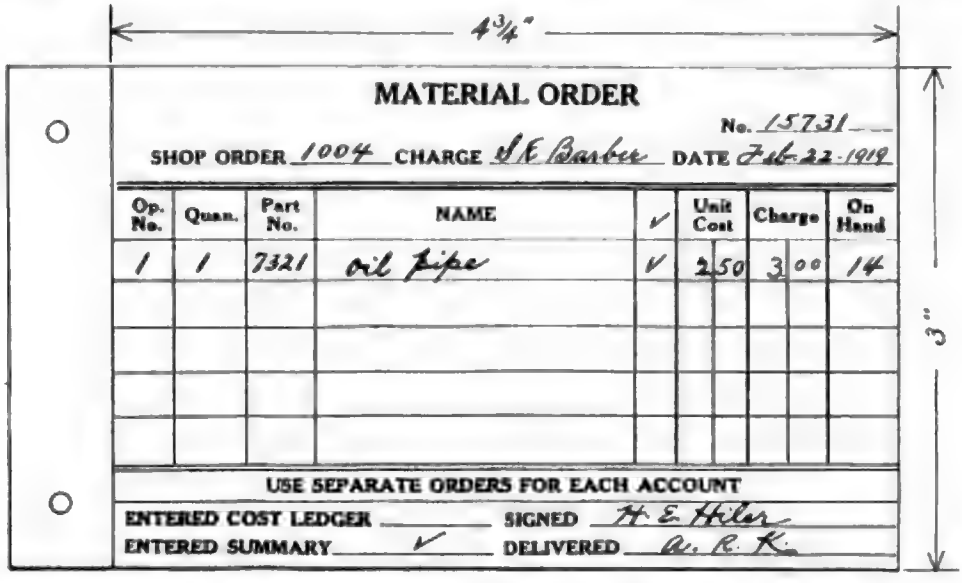
DATE	Op. No.	PART	NAME	CHARGE PARTS	CHARGE MISCEL.
2.22	1	7321	oil pipe	3 00	
2.22	1	"	1 gal. oil		60
2.22	2	4350	1 exhaust valve	1 30	
2.23	3	875	1 R.H. Front fender	12 00	
				16 30	60
PARTS CHARGE, LESS DISCOUNT				15 67	

SUMMARY		
PARTS	15 67	
MISCELLANEOUS		60
LABOR	18 80	
TOTAL	35 07	

INVOICED Feb 24 - 1919 No. 3720

FRONT SIDE REVERSE SIDE

Fig. 2—Form (A)—Original car record, made out by receiving inspector on receipt of car, and signed by the owner. It is immediately sent to the office, and all subsequent charges are entered on it. Note that these forms are to be kept in a loose leaf note book, and are numbered serially. Sheet is 6 by 10 in.



MATERIAL ORDER

No. 15731

SHOP ORDER 1004 CHARGE S. E. Barber DATE Feb. 22. 1919

Op. No.	Quan.	Part No.	NAME	✓	Unit Cost	Charge	On Hand
1	1	7321	oil pipe	✓	2 50	3 00	14

USE SEPARATE ORDERS FOR EACH ACCOUNT

ENTERED COST LEDGER _____ SIGNED H. E. Hiler

ENTERED SUMMARY ✓ DELIVERED A. R. K.

Fig. 4—Form (B)—Material order, made out in duplicate by the workman, and turned into the stockroom. The material is delivered, the original maintained for the stockroom record, and the carbon sent to the office and the charge entered on form (A), Fig. 2. The form shown above is actual size.

used by each workman for each part of each job on which he works, and at the completion of that work, or at the end of the day, is sent to the office and entered on form (A), Fig. 2. It is then entered on the payroll for checking against the daily time card, and filed under the workman's name or number.

As each portion of the work is finished, it is checked off on the S. O. card attached to the car, and if the workman's job time card on the job be slipped into the holder while he is working, the status of the job may be seen at a glance.

When the job is completed, the foreman can glance over the S. O. card, note that all

6"

FORM (A) DUPLICATE TO STAY WITH JOB

NAME S. E. Barber S. O. No. 1004
ADDRESS 7 Goodrich DATE Feb 22 19
PHONE John 192 CAR Cad. 55 LICENSE 15076
SPEEDOMETER 12298 PROMISED 2-24 BY AJR

1— Repair oil leak in timing gears
2— Grind exhaust valves & adjust.
3— Replace right hand front fender
4—
5—
6—
7—
8—
9—
10—

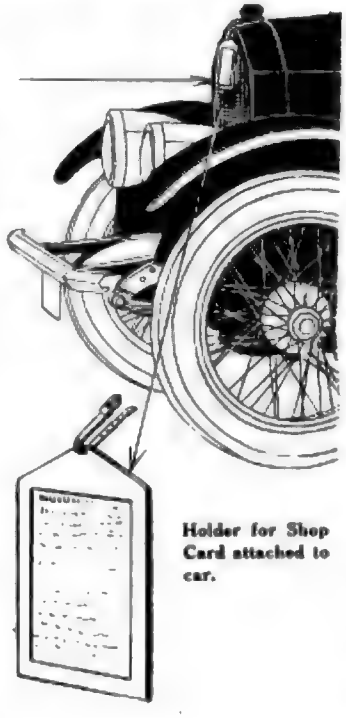
10"

REMARKS

Above repairs effected DATE Feb 24 1919
but car in poor general condition
A. J. Rowley
Inspector

ACME GARAGE
CAR 55 14 S. Front St. Detroit S. O. No. 1004
LICENSE 15076
RECEIVED Feb. 22-19 RELEASE O. K. K. F.
PROMISED Feb 24 SIGNED: S. E. Barber
FOR INFORMATION CALL DICKENSON 6300

FIG. 3—Form (A)—Duplicate of each record that stays with the car. It is cardboard, and a carbon of the original. The lower portion is the owner's receipt for the car, and should be his identification in receiving the car after repair. Card is about 6 by 10 inches to fit in holder attached to radiator cap. Holder is made of leather substitute and pyralin. The strap has a snap fastener.



Holder for Shop Card attached to car.

is their notice that the car is ready for delivery, and either they or the inspector can notify the owner.

If the final inspector feels that the work authorized is O. K., but that the car is in poor general condition, or needs further repairs, he notes this fact on the reverse of the "completed" card that it may be brought to the attention of the owner on delivery.

The owner on calling for his car presents his receipt stub (Form (A), Fig. 3) at the office and has the "Release O. K." space signed, indicating that the repair is either paid or properly charged. By turning the card over to the final inspector, the car is released. The receipt, together with the "Completed" form are sent to the office and filed with the S. O. carbon form for record and future reference.

This completes the working of the system as applied to the shop. The bookkeeping and accounting end are not discussed, and need not differ from that ordinarily used in any business. However, the labor cost and labor charges; parts cost and parts sales, should be carefully kept, summarized and studied, to enable intelligent reduction in costs and increase in profits.

authorized work is accomplished to his satisfaction, and forward the car to the final inspector or tester.

In the meantime, all material, parts and labor charges have been forwarded to the office, and the original S. O. card brought up to date. There remains only to get the final O. K., release the car and render the bill

Function of Final Inspector

On chart Fig. 1, the final inspector is shown separate from the receiving inspector, but ordinarily they are one and the same person or group of persons. It is the function of the final inspector to impartially determine if the shop has done what the owner wishes in a manner that is up to the standard of the station. In a small shop the final inspector may be the shop foreman, or proprietor himself—but some one person should be responsible for all work sent out.

The final inspector tests the car, if necessary, and sends it back to the shop if the work is unsatisfactory. If O. K. he attaches Form (D), Fig. 6, to the car, and sends the carbon S. O. card to the office. The latter

COMPLETED

NAME S. E. Barber S. O. No. 1004
ADDRESS 7 Goodrich St. PHONE John 192
DATE PROMISED 2/24 COMPLETED 2/23

REPAIRS AUTHORIZED COMPLETED
(For Remarks See Reverse) A. J. R.

FIG. 6—Form (D)—When the work authorized is completed, the car is inspected, and if O. K. tagged with this card. The shop S. O. card, Fig. 3, is sent to the office and is their notice that the work is done and that the bill may be rendered. Form shown above is actual size.

JOB TIME CARD

Man No. 47	NAME H. E. Drew
S. O. No. 1004	NAME S. E. Barber

Op. No.	HOURS	REMARKS
1	7	oil leak in gears
		timing gears

USE SEPARATE CARD FOR EACH JOB		TIME	
		Regular 7	Over
ENTERED		RATE	
S. O. Card	Pay Roll	Labor 75	Overhead 100%
✓	✓	COST	
		Labor 5.25	Overhead 5.25

3"

FIG. 5—Form (C)—Individual job time card, made out by the workman for each job operation as shown by the S. O. card, Fig. 3. The reverse side bears the time clock stamp, if a time clock is used, and the card is O. K'd by the foreman, and sent to the office for accounting. The form shown above is actual size.

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"Vehicle Monthly" Time Savers

"The Vehicle Monthly" will appreciate the receipt of any "Time Saver" made by its readers.
A rough sketch and a short description are all that is necessary.

This Series of "Time Savers" was Begun in the February Number. Back Numbers Can Be Obtained from the Publishers

"Vehicle Monthly" Time Saver No. 11

ELECTRIC DRILL SCREW DRIVER ATTACHMENT

In body work, where many screws have to be inserted or removed, an electric drill driven screw driver facilitates the work. It is a screw driver having a bell-mouthed sliding tube, acting against a spring, and retained by a pin, serving as a guide to direct the driver to the screw slot. With this screws may be driven nearly home, or removed after loosening, in an instant.

• • •

"Vehicle Monthly" Time Saver No. 12

RUSH-JOB BOARD FOR SHOP

In almost every shop there are several jobs that must be rushed to completion. These jobs may be kept constantly before the foremen and workmen by means of a special blackboard as illustrated. Each day the foreman goes over the jobs at hand, brings the board to date, and pushes the job. It is a visible index on what the shop must do.

• • •

"Vehicle Monthly" Time Saver No. 13

PARTS-CLEANING ASPIRATOR

It is ordinarily difficult to loosen dirt from inaccessible parts. But this may readily be done by means of a parts cleaning aspirator comprising an air pressure jet with a small tubular connection to a cleaning liquid supply as shown. The cleaning liquid—kerosene preferable—is drawn from the container and thrown onto the parts to be cleaned in a spray, quickly loosening the dirt.

• • •

"Vehicle Monthly" Time Saver No. 14

SHOP TELEPHONE

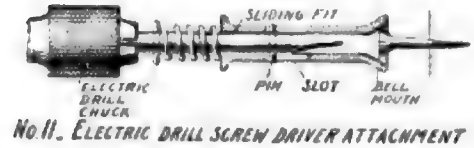
Much time is lost by shop foremen and executives in running to the phone, especially if the shop be large. This can be obviated by providing plug connections at various convenient parts of the station, and all necessary persons carrying small watch combinations, transmitter and receiving sets. If each have a personal signal sounded by a gong, he can step to the nearest plug and answer. Or a call may be entered from any connection.

• • •

"Vehicle Monthly" Time Saver No. 15

PORTABLE SHOP BENCH

On many jobs it is more convenient to take the bench to the car than the car to a bench. A portable bench is illustrated that is mounted at one end on wheels, carries a tray with compartments for parts and tools and is fitted with a vise. This may be used in the garage, or on cars at the roadside necessitating minor repairs.



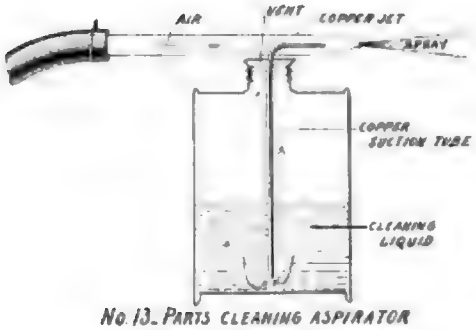
No. 11. Electric Drill Screw Driver Attachment



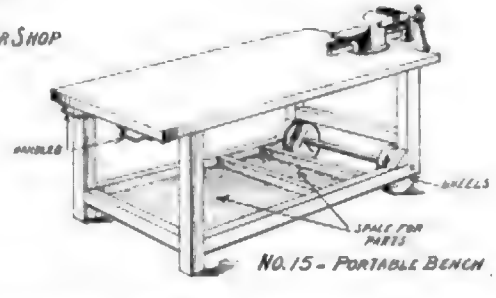
No 12. Rush Job Board for Shop



No 14 Shop Telephone



No. 13. Parts Cleaning Aspirator



No. 15 - Portable Bench

"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTIONS ON THIS PAGE

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The New Gramm-Bernstein One and One-Half-Ton Truck

The trade is displaying a great deal of interest in the new 1½-ton truck recently announced by the Gramm-Bernstein Motor Truck Company, Lima, Ohio.

Freed from its contracts for making Class B military trucks—of which it made the first one, by the way, and also sent forward the first convoy of thirty trucks for overseas service—the Gramm-Bernstein company is now preparing to push its complete line, but especial attention is being given to the new 1½-ton job.

In addition to being extra size for its rated capacity in practically all of its vital parts, the new truck has a novelty in a Three-in-One body, which gives the truck owner the combination benefit of a flare-board express body, a high slatted body, and a tarpaulin-covered body.

Through the flare-boards of the express body, provision is made for the insertion of stakes carrying the slatted sides, and these stakes in turn may be fitted with the irons which support the tarpaulin cover.

This Three-in-One body is expected to appeal particularly to the farmer and to the one-truck man who must make his truck do a variety of work.

Dealers who have seen it all express a great deal of enthusiasm with regard to this body as a sales feature. Two other types of body are furnished with the complete truck—platform stake and slatted stake, each in high, medium and low styles.

The new model is heavily powered with a Continental Red Seal "N" motor 3¾ x 5.

The rear axle—a Clark (Celfer)—is as strong as used by many builders for a two-ton truck, the bearings in particular being as large as those usually specified for a truck of much higher rating.

The springs are vanadium alloy. They are heavier and have more leaves than is usual in a truck of 1½-ton capacity. The radiator is the Gramm-Bernstein cast type, and cushioned to the frame by springs.

The frame is especially strong and has six cross members, integrally gusseted, with two rear diagonal braces which absolutely prevent torsional strain and misalignment.

The Northeast electric system is used and the horn is electrically operated.

The propeller shaft is in two pieces, with three universal joints instead of two, which does away with the "whip" of a long, one-piece shaft.

Both brakes act on the rear wheels, it being the opinion of B. A. Gramm that the propeller shaft brakes tend to cause excessive wear on the rear bearing of the transmission.

While this new 1½-ton truck is to be featured by the Gramm-Bernstein Company, heavy-duty, worm-drive models are also made in 2, 2½, 3½ and 5 ton capacity, as in the past.

Condensed Specifications

Radiator—G.-B. own make, cast tank and tubular type. Very efficient.

Motor—Continental Model "N" Red Seal, 4-cylinder, 3¾ x 5-inch *en bloc*.

Clutch—Multiple disc, dry plate, fully enclosed.

Transmission—3½ per cent. nickel steel gears, heat-treated, 3-speed forward and reverse. Very ample gear faces.

Drive—Hotchkiss, 2-piece propeller shaft, fully enclosed metal universal joints.

Rear Axle—Clark Equipment Company (Celfer) internal gear, sturdy, heat-treated, nickel steel load-carrying member, extra large New Departure and Hyatt high-duty bearings in wheels and differential.

Front Axle—Heat-treated I-beam drop forming. Taper roller bearings in wheels.

Brakes—Service 15½ x 1½-inch internal expanding on rear drums. Emergency, 16 x 2 inches, external contracting on rear drums.

Springs—Front, 40 x 2¼ inches, 10 leaves, bushed eyes; wick oilers instead of grease cups; rear, 52 x 2½ inches, 11 leaves, bushed eyes; wick oilers instead of grease cups.

Wheels—Front, 36 x 3½, solid; extra for 35 x 5 front pneumatic cord tires; rear, 36 x 5, solid; extra for 38 x 7 rear pneumatic cord tires.

Steering—Ross 18-inch wheel.

Frame—Pressed steel, well gusseted, 5 x 2½ x ¼-inch channel.

Ignition and Lighting—"Northeast" generator and distributor, 6-80-hour storage battery. Magneto for export extra.

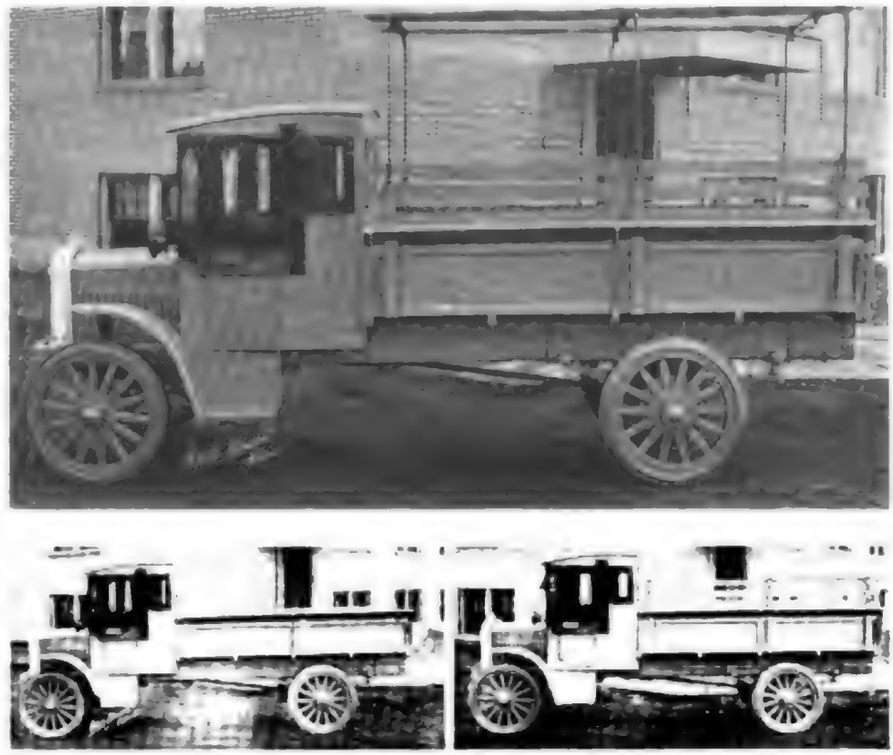
Lubrication—Combination force feed and splash system.

Carburetor—Stromberg, 1-inch.

Gasoline Supply—Gravity. Gas tank at dash.

Equipment—Pump, jack, tools.

Wheel Base—138 inches.



NEW GRAMM-BERNSTEIN ONE AND ONE-HALF TON TRUCK, WITH THREE-IN-ONE BODY. Built by the Gramm-Bernstein Motor Truck Co., of Lima, Ohio.

Loading Space Back of Seat—120 inches.

Turning Radius—51 feet.

Road Clearance—11 inches.

Chassis Weight with Cab and Body Sills—3,800 pounds.

Air Leaks in Engine Cylinders

A defect in the engine that is usually ignored is an air leak which prevents efficient regular operation. These leaks may be at the joint of the cylinder head, around the spark plugs, past the piston rings, or the valves may not be tight, all of which would lower the compression and power. Others may occur around the valve case or the joints of the intake manifold, which would cause irregular ignition.

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Standardization of Motor Trucks

By D. C. Fenner, of the International Motor Co. A paper read at the Motor Truck Manufacturers' Convention, New York, Feb. 11, 1919, held under auspices of the National Automobile Chamber of Commerce.

In the last seven years this association has adopted the following motor truck standards:

1—Speed ratings.
2—Body weight allowances.
3—Frame widths and lengths.
4—Caution plates.
5—Demonstration charges.
6—Definition of standard chassis.
7—Warranty.
8—Service policy.
9—Repair parts policy.

In addition, manufacturers have accepted most of the truck standards adopted by the Society of Automotive Engineers affecting mountings and connections for auxiliaries, piping, wiring bearings, couplings, springs, tires, etc.

In the writer's opinion, manufacturers have never given sufficient consideration to standardizing the position and manipulation of spark, throttle, gearshift and emergency brake levers. A standard "gate" or location of the gearshift positions in relation to the driver's seat is highly important. If the S. A. E. standards which already apply to those features are not commercial, manufacturers should apply for a revision. If, on the other hand, there are among the details of motor truck design some features which are quite likely to be changed by further development, it would not seem wise to attempt their standardization at present. Such standardization as will hinder development should be discouraged.

The types of chassis standardized for army work during the war emergency contain details of design selected by engineers who volunteered for this work, as representing the average practice of the times, with the extraordinary requirements of army service kept constantly in mind. The fact that these engineers considered it necessary to develop special types for army work does not necessarily indicate that these types will prove practical and economical for average commercial service, and, as this is the problem of the immediate future, it is the basis on which we must consider the advisability of further standardization.

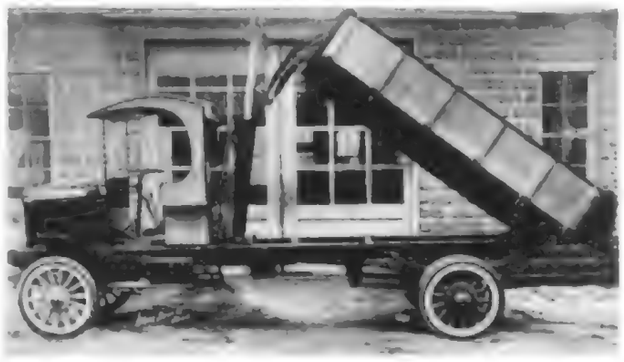
The past two years have witnessed very few changes in type or in mechanical details. Engineers have been busy with other work and factories have aimed at quantity production on present standards.

We are now entering a period of developments in which many problems must be solved by all branches of the industry. No one feels, for instance, that we have reached the ultimate type of power-driven road freight vehicle. At present no one will even venture to predict the ultimate source of power. Three are already in use, but none has as yet been developed satisfactorily from a strictly utilitarian point of view.

The internal combustion engine has the largest following, but there is nothing definite in sight as to whether it should be constant speed or variable speed governed, or ungoverned. How it should be fed, fired, cooled, mounted or controlled; how its power should be transmitted to the driving wheels, whether these driving wheels should be forward or rear; whether, indeed, four wheels will serve to distribute properly the most economical load that can be transported over the most economical form of highway.



BODY FOR FOUNDRY HAULING.
Built by the Union Motor Truck Co., Bay City, Mich.



THREE CUBIC YARD DUMPING TRUCK.
Built by Brockway Motor Truck Co., Cortland, N. Y.



RACK BODY WITH REMOVABLE SECTIONS.
Equipped with Pneumatic Tires. Built by Brockway Motor Truck Co., Cortland, N. Y.



LONG DISTANCE MOVING VAN.
Built by the Union Motor Truck Co., Bay City, Mich.

The greatest item of expense in present-day freight transportation is the expense of idleness. Methods of loading developed to reduce this expense may call for radical changes in body location and weight distribution. The use of giant pneumatic tires on heavy duty chassis will certainly necessitate a complete revolution in many details of chassis design.

The general condition and appearance of the average truck just before the first annual overhaul indicates that we still have considerable work ahead. Better protection against "bonehead" operation, against road dirt and against colliding vehicles is desirable. Many truck operators carry collision insurance. The cost of repairs from collision is always a big item in maintenance expense.

The vulnerable point in collisions is the front end, which is more or less effectively

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protected by a guard or bumper. Were the driver's seat placed ahead of the engine and radiator would the driver not be in a better position to judge distances and openings in traffic and less enthusiastic over how he sacrificed the forward end of his truck in a traffic argument?

In the apparent belief that automobile lines must be followed as closely as possible, truck designers cover their engine with a hood or bonnet which serves principally to conceal the neglect of the party responsible for keeping this very important element of the chassis in condition. "Out of sight" is "out of mind."

In the future we may well follow the lead of marine engine designers and produce a weather-proof power plant which may be placed at the most advantageous and accessible point in the chassis without the necessity for a hood or other covering. Much better care will be given to an engine which is always in sight, especially if its exterior is sufficiently free from pipes, wires, levers and rods to be cleaned easily.

Referring again to collision insurance, truck brakes and steering assemblies must be strengthened and simplified.

The performance of the average truck's differential leaves much to be desired. A form of drive which will transmit power to the wheel having traction, without wrecking the transmitting mechanism itself, would be most welcome.

While on the subject of standards, we might suggest standard operating conditions. Manufacturers put considerable effort in instruction books, which are supposed to represent their ideas on this subject, yet I venture to state that the poorest, dirtiest, most disgraceful-looking trucks on the road today are often those owned and operated as shop trucks by these manufacturers themselves.

The conditions of worn parts ofttimes indicates that there is still room for the lubricating engineer to check the designing engineer on clearances and proper grooving and oil channels. Many fits, when new, admit of absolutely no lubrication. Wear soon takes place; then lubrication at this point goes the limit, with consequent waste.

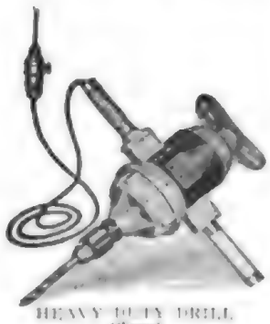
There is much evidence that the point and method of applying lubricants could be much improved. In plain bearings some designers groove the bushing, others groove the shaft or pin. Grooving is radial, spiral, longitudinal or diagonal, according to the school of the designer. The operator who pays for the replacements often wishes for more light on this point.

Portable Garage Tools

Vehicle body builders who have been long using Stow wood boring machines and other appliances made by the Stow Mfg. Co., Binghamton, N. Y., do not require evidence that Stow tools are classed high in the estimation of all mechanics who use them. They know their worth from practical experience.

The same long-established concern also manufactures a line of machines for chassis repair work which are giving equal satisfaction. They are used, not only in large and small repair shops, but in the factories of the leading automobile and horse-drawn vehicle manufacturers throughout the United States.

The series of six cuts shown on this page illustrates but a very small portion of the many "portable tools of proven value" made by the Stow Mfg. Co., and described in the several catalogs issued by this concern. One of these catalogs is known as Bulletin 102, describing and illustrating numerous tools using the famous Stow flexible shafting. Another catalog is issued as Bulletin 101, covering a big line of portable electrically-driven tools, electric motors and special machines.



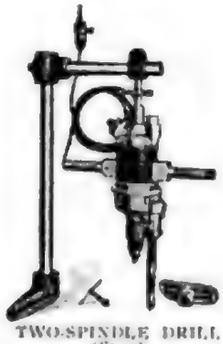
HEAVY DUTY DRILL (Stow)

This tool is a standard size for small repair shops and garages. Universal, alternating or direct current.



FLEXIBLE SHAFT GRINDER (Stow)

For use in steel working plants. Mounted on portable truck, with extension arm, enabling operator to work over a large area, with maximum efficiency.



TWO-SPINDLE DRILL (Stow)

Maximum capacity 1 inch in metal, the only tool of its kind in the market, furnished for speeded or universal currents.



SLIDE TOOL POST GRINDER (Stow)

For speeded currents as universal currents for grinding are inefficient. Used for grinding centers, dies, cutters, etc. Very strongly constructed.



SUSPENDED "GEE WHIZ" MACHINE (Stow)

Combination grinding and drilling tool, made in all sizes for all currents.



BENCH GRINDER No. 2 (Stow)

A light tool to do tool grinding and fine grinding for manufacturing purposes. Can be operated from any lamp socket.

The Attwood Grease Machine

The Attwood Brass Works, Grand Rapids, Mich., are the makers of the Attwood grease machine, for the quick and clean handling of greases and heavy oils. There are two styles, one for heavy and fibrous greases, the other for heavy oils and light and medium greases. This machine is one of the most convenient articles ever placed in a garage, repair shop or service station. The same company manufactures the "Attwood" line of body hardware.

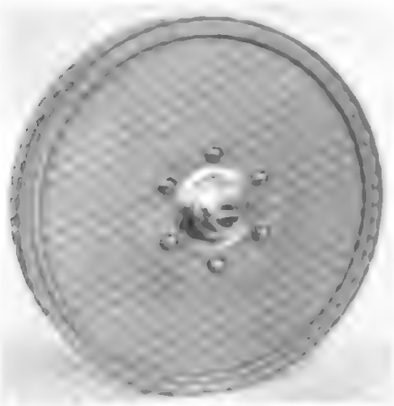


THE ATTWOOD GREASE GUN.

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Budd Single Disc Wheels

On page 21, of our March number, we printed a story concerning the cars delivered by the Locomobile Co. to General Pershing and his staff in France. We did not mention, however, that the eight cars were equipped with Budd single disc wheels, made by the Budd Wheel Corporation, Philadelphia.

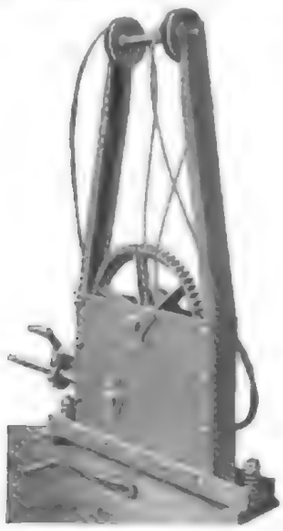


Budd Single Disc Wheel

The Budd Wheel Corporation is one of the largest manufacturers of automobile wheels, both wire and disc types, in this country, supplying them to many of the most prominent car builders. A branch of the Philadelphia concern is maintained in Detroit.

Columbian "Lightning" Hoist

The problem of dumping loose materials from motor truck bodies, such as sand, gravel, coal, dirt, refuge, etc., has been solved by the Columbian "Lightning" hoist, manufactured



Columbian "Lightning" Hoist.

by the Columbian Steel Tank Company, 1601-21 West Twelfth Street, Kansas City, Mo. All objections known to the hand hoist have been overcome in this new equipment. This hoist will fit any chassis, and can be mounted by anyone in a few minutes, without drilling holes into the frame. It handles with ease loads of from one to five tons with but one man at the crank.

Wartime Studies of Wood and Glue

The war has placed an opportunity in the hands of vehicle body manufacturers to benefit by the increased knowledge of the peculiarities and characteristics of wood and glue.

Under the stress of war and the necessity of furnishing aircraft to the fighting front in large numbers and a short time, it was found necessary to supplement the information available on wood and glue by extensive additional research work on these two important construction materials. It was found in many instances that factories taking Government contracts for aircraft and wagon work had, in their desire to help, neglected to go into the situation thoroughly and found themselves unable to produce on schedule. The rigid Government inspection showed them that their equipment was inadequate to meet the special demands placed upon it, and their knowledge of the peculiarities of the material was not sufficiently exact.

Many varied difficulties were encountered. Vehicle manufacturers had trouble drying stock. Lumber for wagons to be used in the hot, sandy sections required more thorough drying treatment than lumber for wagons to be used in more moist districts, and it was necessary to dry heavy stock quickly. Propeller manufacturers found that making propellers involved a great many more variables than the mere gluing of laminations and and shaping the block—internal stresses occurred that caused warping and open joints in seemingly perfect blocks. Though they had been using glues for many years, they soon discovered that there was a wide difference between high-grade laminated work and the class of work ordinarily accepted as commercial standard. It is not surprising that the panel manufacturers making aircraft plywood for the various Governments had some little difficulty at first in meeting aircraft specifications.

Waterproof Glues

While waterproof glues have been in existence for some years, they were not well known and little information was at hand as to the correct procedure for their successful use. During the war the Forest Products Laboratory of the United States Forest Service at Madison, Wis., has been working on problems that seemed to give trouble to the plants engaged on war contracts. Much help has been given manufacturers and a large staff of specialists has been engaged in obtaining information and developing new ideas in the uses of glues and wood.

It must be inferred that absolute information is at hand concerning all phases of the uses of woods, and that the laboratory will be at once a panacea for all ills. Even though much has been learned, there is still much to be done. It is merely pointed out that the Government maintains under jurisdiction of the Forest Service an institution equipped to handle many of the difficult problems continually arising in the manufacture of vehicle bodies and panels, furniture, and other wood products.

Strength of Commercial Liquid Glues

Most of the commercial liquid glues are manufactured from the skins, heads and bladders of fish. Others are made by special treatment of the glue extracted from the hides, skins and bones of cattle; some for special uses are prepared from starch, from various natural gums, or from casein.

At the Forest Products Laboratory tests were made by inspectors on a number of these liquid glues, who found that they differ very widely in strength. Some of them are so weak as to be entirely unsuitable for woodworking purposes, while others compare favorably in strength with the "hot" glues. The glues tested varied from one which exerted a binding force of less than 50 pounds per square inch to one with an adhesive strength 60 times as great, or more than 3,000 pounds per square inch.

Method of Testing Strength

Liquid glues may be tested by gluing together pairs of specially selected hard maple blocks, placing them in a testing machine, and measuring the force required to shear them apart. About 300 specimens, representing 26 different glues, have been tested in this way at the laboratory. According to the data thus obtained, a high-grade liquid glue should have an average shearing strength of not less than 1,700 or 1,800 pounds per square inch.

In addition to uniform high adhesive strength, it is evident that certain other characteristics are desirable in a liquid glue. When spread upon wood surfaces, it should "set" and dry rapidly. In its container it should remain fluid and workable at all ordinary temperatures. It should be elastic and shock-resistant. It should not be unusually susceptible to the action of high temperatures, high humidity, molds and bacteria.

The study gave evidence that the strength of liquid glue, like that of "hot" glue, depends largely upon its "body" or thickness, or, strictly speaking, upon its viscosity. Of eleven liquid glues examined, the thickest or most viscous glues showed the greatest adhesive strength.

Ready Cut Engine Gaskets

Ready-made gaskets, cut with every opening exactly fitted to the engine for which it is intended, are decided time savers in any shop



Ready-cut Gasket for Dodge Engine.

where engine overhaul is a part of the day's work. The Fitzgerald Mfg. Co., Torrington, Conn., specialize in ready-cut gaskets for practically all makes of cars. Several other garage and repair shop specialties are made by this concern. Catalog free on application to the company.

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BODY DEPARTMENT

VEHISOTE *The Ideal* PANEL Material



Dodge Brothers (Detroit) standard closed commercial car body. Vehisote sides and rear door panels. Several thousand of these bodies now in use or in course of construction.

VEHISOTE is in one piece and provides a smooth, jointless surface which is absolutely waterproof and cannot split or check.

VEHISOTE should not for a moment be confused with materials which are made by a laminated process in which the final product is attained by building up various "plys" of the same material.

VEHISOTE is a homogeneous, individual material, made by a distinctive and special process. Like steel, VEHISOTE is made by a fluxing and moulding process, which interweaves and interlaces the fibers into one complete fabric.

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For Automobile and Carriage Work

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Motor Bodies and Parts

Labor Saving Machinery in Custom Shops

There is such a great diversity when wholesale manufacturing of automobile bodies is compared with custom-made work, that a short description cannot convey an idea of the process of evolution from a one-inch scale drawing to the finished body. Management is far different when the two systems are compared. The mechanics use different appliances in construction, and for wholesale work special machinery is used to accelerate production and duplication in all minor parts, while custom body methods are a continuation of coach body construction, which is almost all hand work.

While there is a great similarity when old-time custom work is compared with the present system, the improvements which have been made during the last fifteen years have changed the manner of construction and have accelerated the output considerably.

Why Buyers Want Custom Jobs

There exists considerable diversity in wholesale manufacturing from its laying out up to the finishing of the body, with many operations which vary in all wholesale manufacturing plants. From a practical viewpoint descriptions of such work are very interesting, because they give the manufacturer, the buyer and user of motor vehicles a good idea why vehicles manufactured in quantity can be produced cheaper than in a custom shop. But it is the "sameness" that is objected to, as many of the buyers want individual ideas embodied in their motor vehicles, and this is especially the case with the body.

In wholesale motor body construction, after all the calculations for the body have been made, which is in itself considerable work and expense, the special machines do the planing and lapping of all the pieces to perfection, so the pieces will fit as well as if done by hand work. The old-time method of putting in screws by hand, no matter where located on the body, is a thing of the past. The flexible shafts do the drilling of holes, countersinking at the same time and driving home the screws in an astonishingly short time. In fact, every part of the body is laid out and finished on special machines, which fit them accurately.

All the above-mentioned work is done in the shortest possible time, doing in a few hours what would require days to do it by hand by the old-time methods. The special appliances and machinery for each part, combined with the skill of the expert team workers, accomplish astonishing results.

Team work has been greatly extended and improved in automobile body construction, and the team workers are all experts in assembling, mounting and finishing the bodies.

The systems adopted in wholesale body construction differ in almost every plant. Some of the systems are very complicated, the great variety of machinery and other appliances, and the division of mechanics so diversified, that a complete description of such a plant would require a thorough knowledge of body construction and the entire plan of doing this work on the factory system.

There is as much diversity in the laying out of bodies as in their construction, and in some plants the body is built by pattern-makers, when the work is exceedingly well done, but very expensive.

Custom builders of automobiles and trucks have learned a great deal from wholesale plants, but there is a great difference when five hundred or more bodies are built in one order, all of them exactly alike, while the custom shop builds one to five only of a single style. But with all this great difference in manufacturing the custom builder is recognized as the creator of styles and also as the inventor of the various systems of convertible and folding top constructions. One fact in favor of the custom builder is that the buyer objects to driving the same style as his neighbor and wants something special, and is willing to pay more for it, if he gets what he wants. Consequently, the custom builder, with his special facilities, can furnish just what is wanted, mostly done by hand, yet using as many labor-saving machines as possible, consistent with securing individuality in the product.

Machinery Equipment of a Custom Body Factory

One of the most modern body plants, where the entire output is custom work, is a good guide in making body comparisons in relation to labor-saving appliances.

We take the plant of the Fleetwood Metal Body Co., Fleetwood, Pa., for an example, not only because it is most modern in its equipment, but also one of the largest, having about forty-five bodymakers on the lower floor, not including the mill room and some storage rooms, while many painters and trimmers are located on the second floor. There is plenty of room for each of the mechanics and plenty of light; in fact all the facilities to produce first-class custom work are available.

The machinery used in the body department is a mortising machine by which all the needed body work can be done; a planer; a double-head shaper; two band saws; a combination saw table and jointer; all made by the American Woodworking Machinery Company. Besides the above there are six band saws and one shaper made by the Crescent Machine Company.

There is also a chain mortiser made by the New Britain Machine Company; jointer, planer and rip saw, made by L. Powers & Company; mortiser, made by Wysong & Miles; single head shapers made by Samuel Shimer; jointer made by The Porter Machine Company.

Besides the above there are various types of smaller machinery in this department, used only occasionally.

In the metal department the following machines are used: Full set of Yoder fender machinery; the Pettingell power hammers; Lennox rotary shears; an acetylene welding outfit; beading and molding machines, made by The Pettingell Machine Company; squaring shears, made by Peck, Stone & Wilcox Company; brakes, made by the Ohl Machinery Company; National electric welder, and rolls, from 3 inches wide to 10 inches wide.

The shaping of the metal for all bodies, of whatever shape, is all done by hand.

In the Trim Department

In the trimming department are six Singer sewing machines, which are constantly employed, but the rest of the trimming work is all done by hand.

Custom-Made Hinges

In a large plant of this kind a great many hinges are used, most of them door hinges, and those employed in convertible top construction. As there are a great many different systems in use, the draftsman makes the calculations for the hinges and hands them over to the patternmakers. In the same place the castings for the hinges are made, machined and finished. This is an important department, and contains the machines and appliances to fit the hinges ready for the body builders.

It will be seen by the above description that a great many machines and appliances are used in the best custom shops, which are well organized to accelerate custom-made work of the highest quality.

The Mull Wood Work Co.

The Tucker Wood Work Company, Sidney, Ohio, manufacturers of bicycle wood rims, auto steering wheels, etc., has been purchased by The Mull Wood Work Co.

E. B. Mull, president of the Mull Wood Work Company, is well known in automobile circles.

Besides Mr. Mull, who was for many years assistant director of service of Willys-Overland, Inc., the company includes several well-known men in the automobile industry.

Working Draft of Sedan Body

Four to Six-Passenger, with New Front

(See Working Draft on page 27)

This body is fitted to a chassis which has 120-inch wheelbase. The space between front of dash and rear end of frame is 97 inches.

The length of body is divided as follows: From front of cowl to front door joint, 23½ inches; width of front door, 23 inches; size of standing pillar, 1¾ inches. Width of rear door, 24 inches; length of body from rear door joint to extreme length on top rail, 36 inches. The entire height of body is 57 inches.

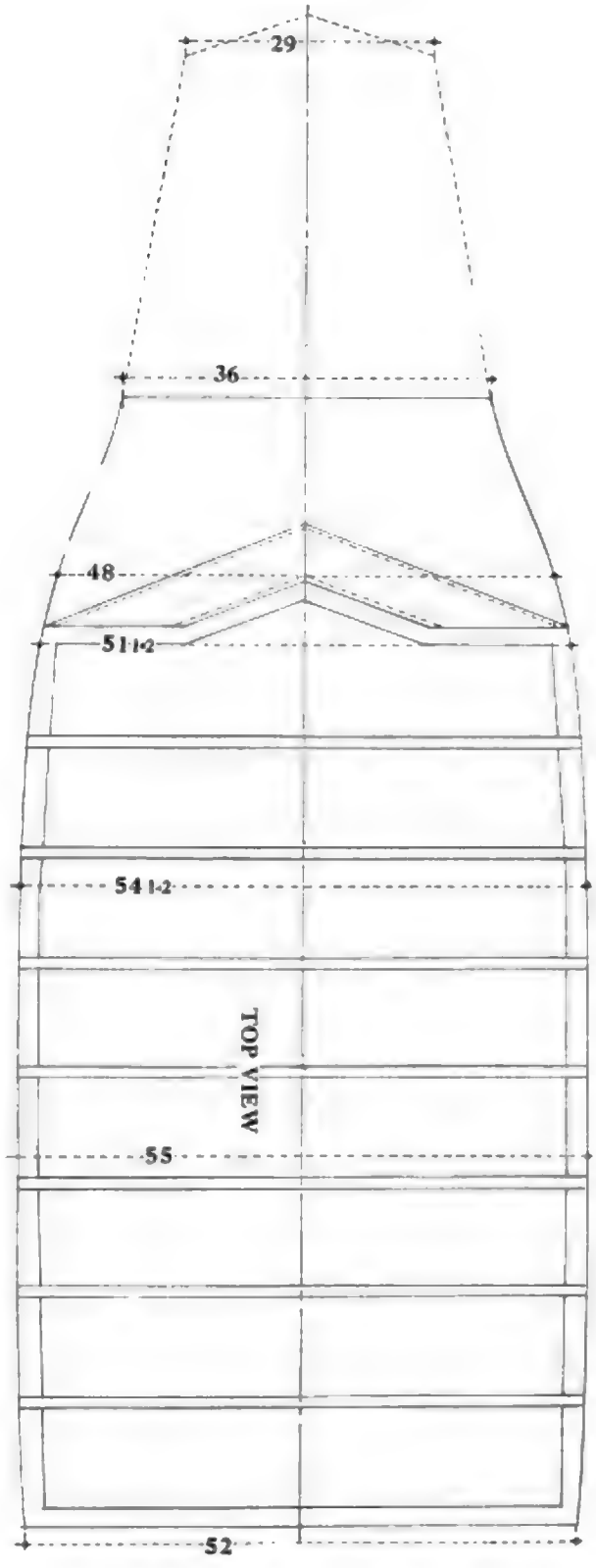
The cross widths of body are different from most of the latest styles. The width across front cowl is 36 inches; at front door joint, 51½ inches; at rear door joint, 55 inches; at rear end, 52 inches, being contracted only 1½ inches on each side on rear end. The widths across the rear door joints are almost alike, and straight. The amount of turn-under on each side is 2¼ inches, without the molding.

There are a great many innovations on this body. The entire depth of top from under surface of door rail to extreme height of top is 4¾ inches, showing that there is very little curve across. In fact, this part is almost straight, sideways and across the body. Note the side elevation and also front and back elevations, producing a different appearance from most of the sedan styles.

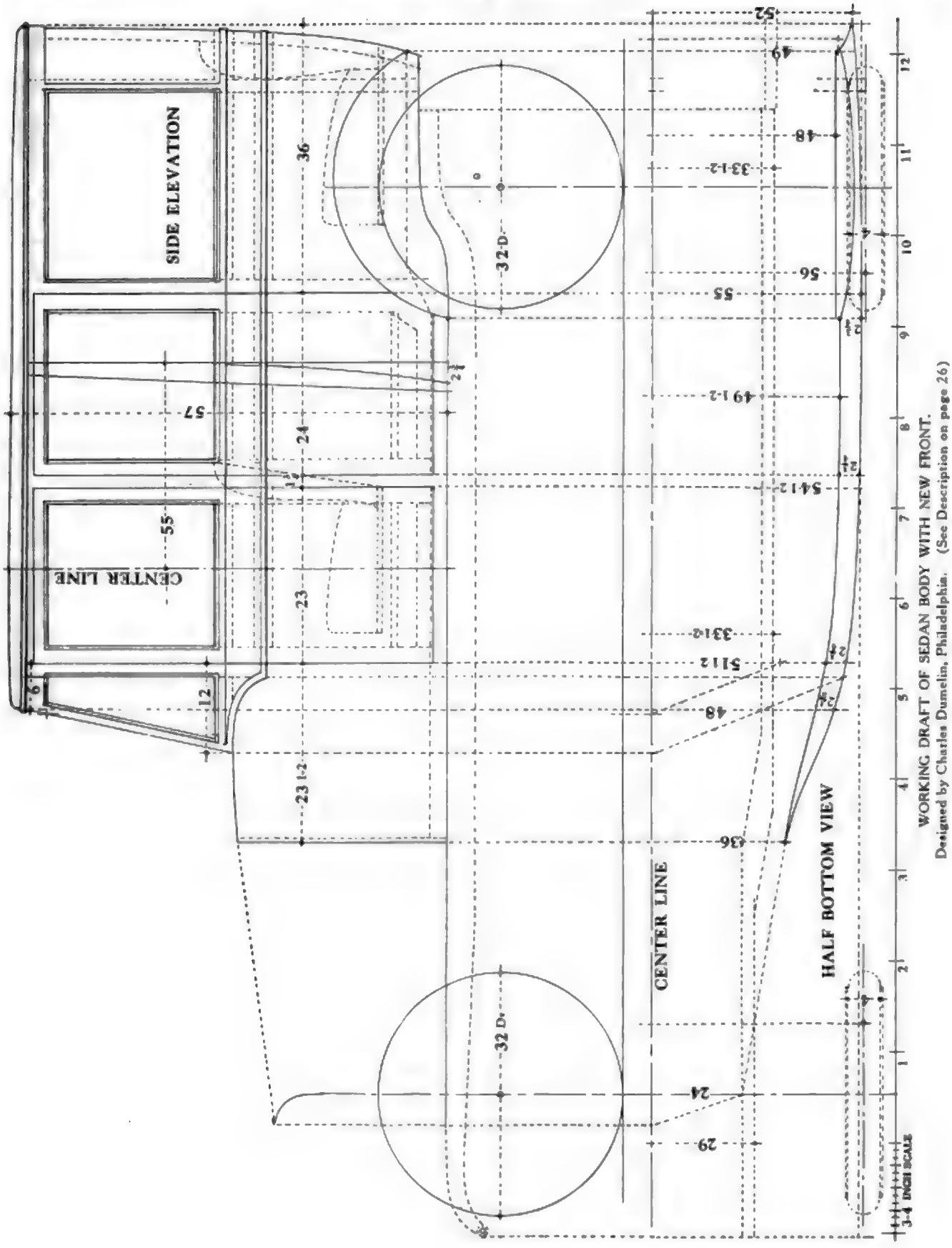
The depth of door rail, cut into the top rail, is 1½ inches only, and the space between the door joints and the door drip molding is only ⅝ inch. The position of the sedan front is similar to other makes, and can be changed to suit the angle, but the entire construction and shape of the front is different from former styles.

The angle of the sedan front is in the center of the body, and from the center at extreme low front end a straight line runs to outside front corner edge of pillar. The upper angular top rail line runs parallel with lower angular body rail. The upper one being inclined toward the front standing pillars, the upper angle is therefore shorter than the lower one, which is well seen on top view and better still on front elevation. The top and bottom part of the sedan front is framed as shown on top view, and the two parallel lines show the bevel. This front, between the upper and lower frame, is entirely of metal and specially made to fit the angles, and to fit the glass. To see the simplicity of construction note the front elevation in connection with the top view and side elevation. All these metal parts can be made in one part, or in three different parts and each piece fitted to the wood part.

Note the shape of the cowl on side elevation, which is decidedly different from usual practice, in fact the opposite from the generally accepted shape. On the former styles the top line of hood and cowl were invariably concave, or the top line of hood was straight and top line of cowl concave. On this draft the hood is straight on top and sides, and the upper line of cowl is convex, starting from the belt rail molding near the



TOP VIEW OF SEDAN BODY. FOUR TO SIX PASSENGERS.
(See description on this page.)



WORKING DRAFT OF SEDAN BODY WITH NEW FRONT.
Designed by Charles Dumelin, Philadelphia. (See Description on page 26)

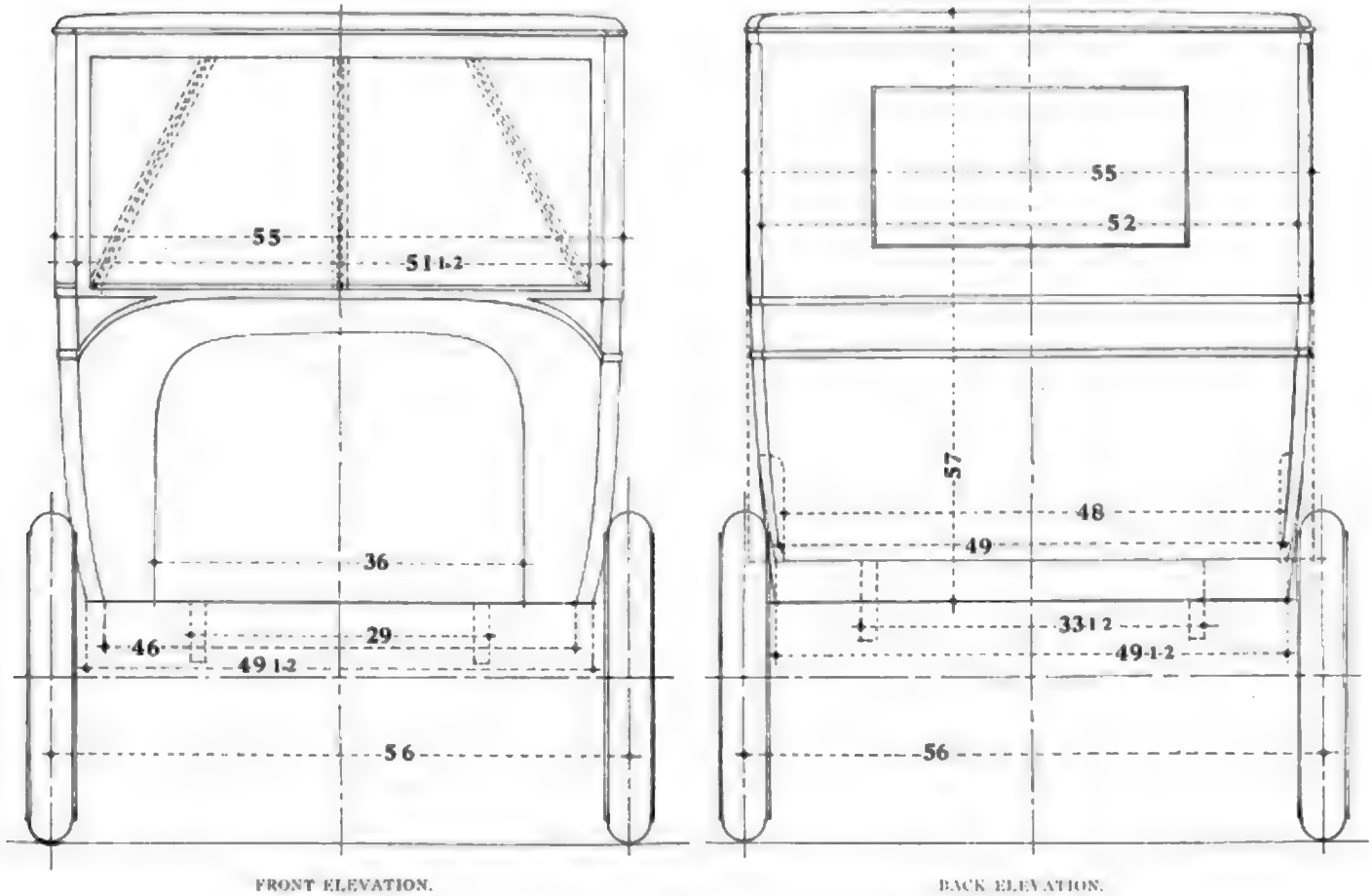
front door joint and running toward the angle of the sedan front on top of cowl. This is different from the general practice and a most agreeable combination of belt rail molding with the sedan front.

The 2¼-inch turn-under on front door joint is blended in toward the vertical line, front of cowl, shown best on half bottom view. This width, across the front of cowl, is 36 inches on this draft, shown on front elevation and bottom view, but as this width differs on almost all frames, it can be changed to suit the shape and width of the frame. Also the amount of the turn-under can be varied. In fact almost any shape can be given the cowl on front edge.

The practice of straightening the fence and belt rails was introduced at the 1918 Astor House show, and has been adopted on this draft. These two lines are perfectly straight on side elevation, and instead of being only 3 or 4 inches apart, the two moldings are 6 inches apart from front to rear end. The space from top of fence rail to bottom edge of sill on this working draft is nearly 31 inches; deducting nearly 7 inches from the above amount makes the space from lower edge of belt rail to lower edge of sill about 24 inches, a great deal lower than has been made in recent years, which makes the change appear more prominent.

The angular windows which were also featured at the 1918 Salon show are carried out in this design on side elevation and on rear end of body.

Note half side elevation on working draft, giving the shape of side curve; also the amount of turn-under and wheelhouse recess. The shape of the top rails is best shown on top view, as well as the rear end corners, with a width of 52 inches, eliminating the long-established rear round corners entirely. The rear end line is straight on this top view, but a little curve to correspond with the top rail would improve the appearance.



FRONT ELEVATION. BACK ELEVATION.

SEDAN BODY, WITH NEW FRONT. DESIGNED FOR FROM FOUR TO SIX PASSENGERS

The Hummer All-Year Top

"Hummerize!" bids fair to become a slogan in the motor car field as "Hooverize" has in the food line. A representative of THE VEHICLE MONTHLY viewed the wonders of the Chicago Automobile Show in January, and one of the important exhibits to be seen was the "Hummer" All-Year Top, which is built by the Hummer Vehicle Works (under the Alvey patents), located at Chicago Heights, Ill. The top attracted such attention that the manufacturers themselves were nearly "taken off their feet."

The important point for our readers is that the company will establish agencies throughout the country, and as there have already been a number of applicants, it means that those who desire the agency for this unique top will have to give the matter quick action. Here are the outstanding features:

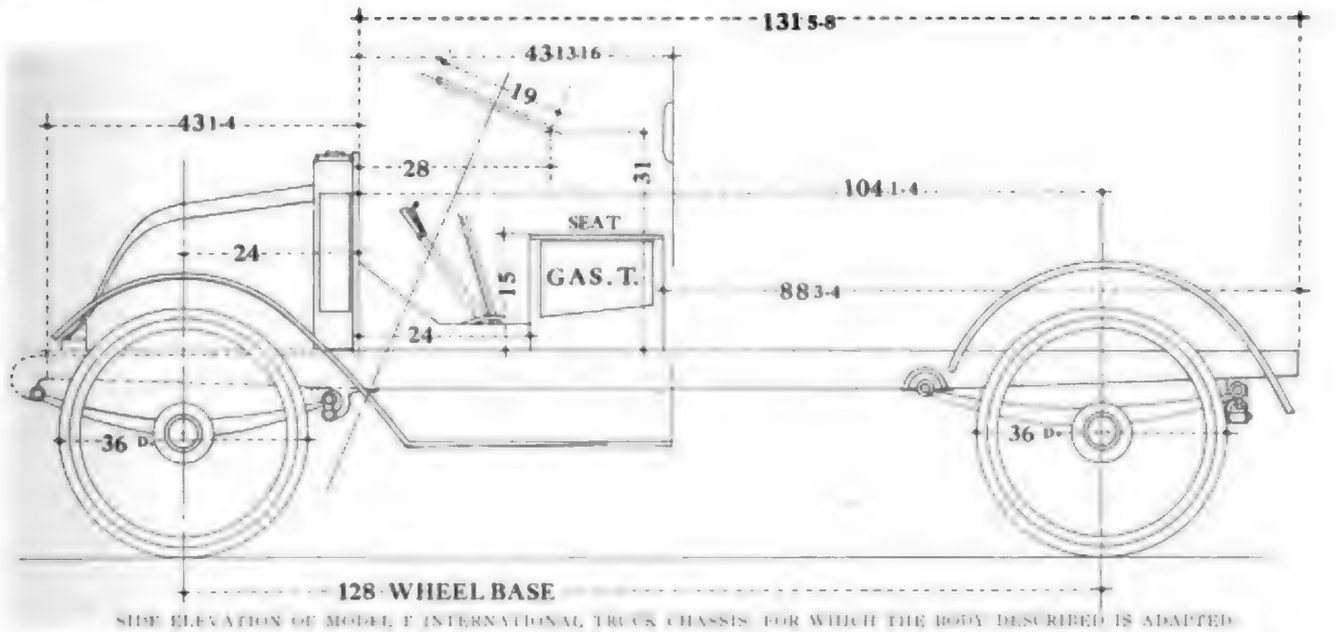
In sudden storm, it takes three minutes, or less, to change from an open to a closed car. The quick attaching of the posts and pulling down of the celluloid curtains, fastening with regular curtain fasteners, changes the car from an all open car to a sedan.

The weight, complete, is from 75 to 110 pounds for touring car, and from 50 pounds for Ford roadster to 75 pounds for a Dodge. It is claimed to be the lightest all-year top on the market.

The top will work on a late 1913 up to present models of Ford and Dodge cars. There are now under construction types for the small Chevrolet and the Maxwell.

The back is of wood with rounded metal corners, making the top very substantial. The lines are graceful, and give to a car a very "nobby" appearance.

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SIDE ELEVATION OF MODEL F INTERNATIONAL TRUCK CHASSIS FOR WHICH THE BODY DESCRIBED IS ADAPTED

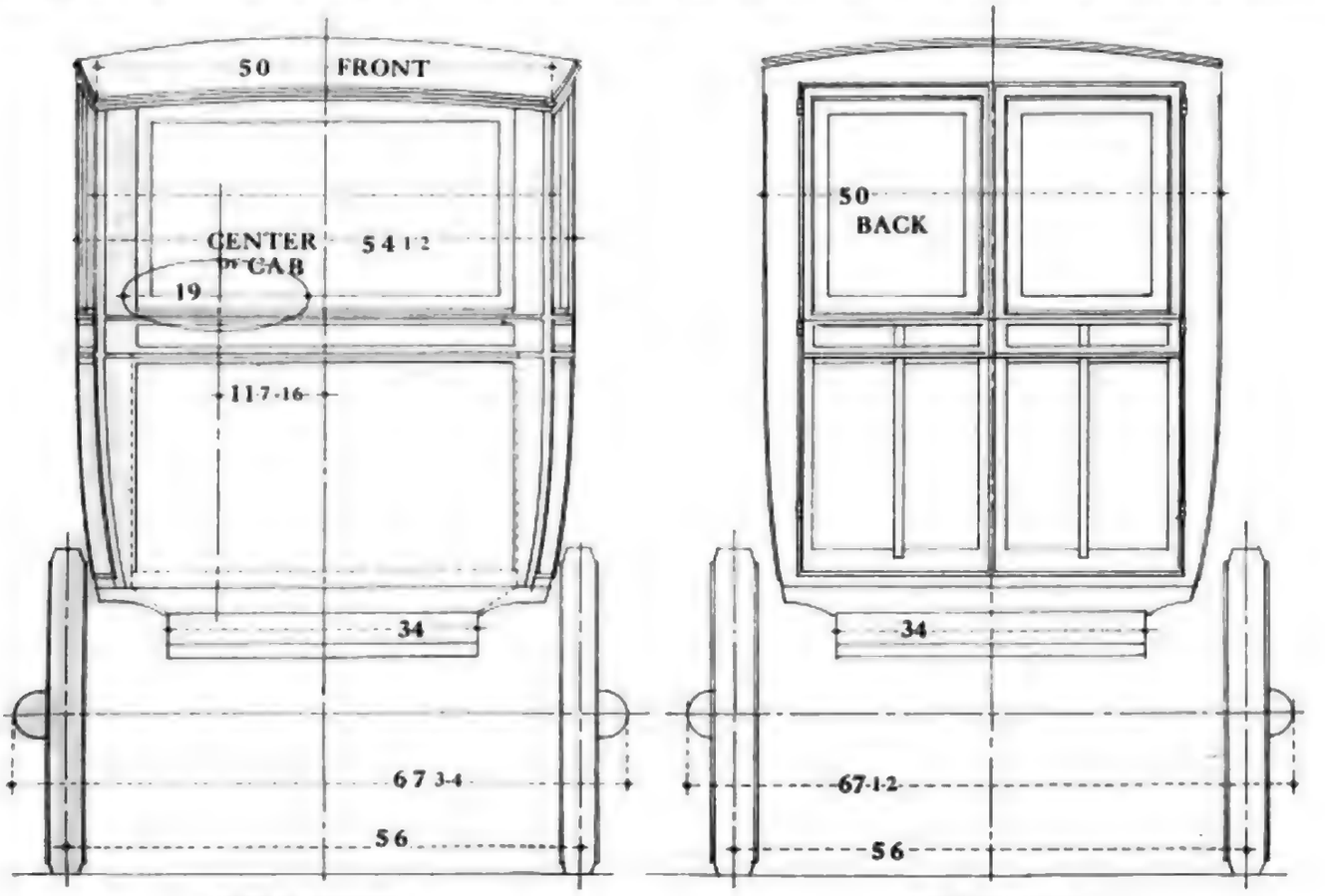
Business Body With Cab

Fitted to Model F, International Truck Chassis

The frame is 5 inches deep at center, tapered toward the ends, 34 inches wide across, out to out. Front tires, 36 inches outside, 3½ inches diameter, and rear tires also 36 inches outside and 4½ inches diameter. The width of track, front and rear, is 56 inches, center to center. Wheel base, 128 inches, center to center of wheels.

The length from center of front axle to front surface of dash is 24 inches, and from front surface of dash to center of rear wheels is 104¼ inches. This latter measurement is needed in case there is a recess for the wheelhouse, as is shown on this working draft, on side elevation and bottom view. The length from front of dash to rear end of frame is 131⅝ inches; thus the body can be made longer or shorter, as desired.

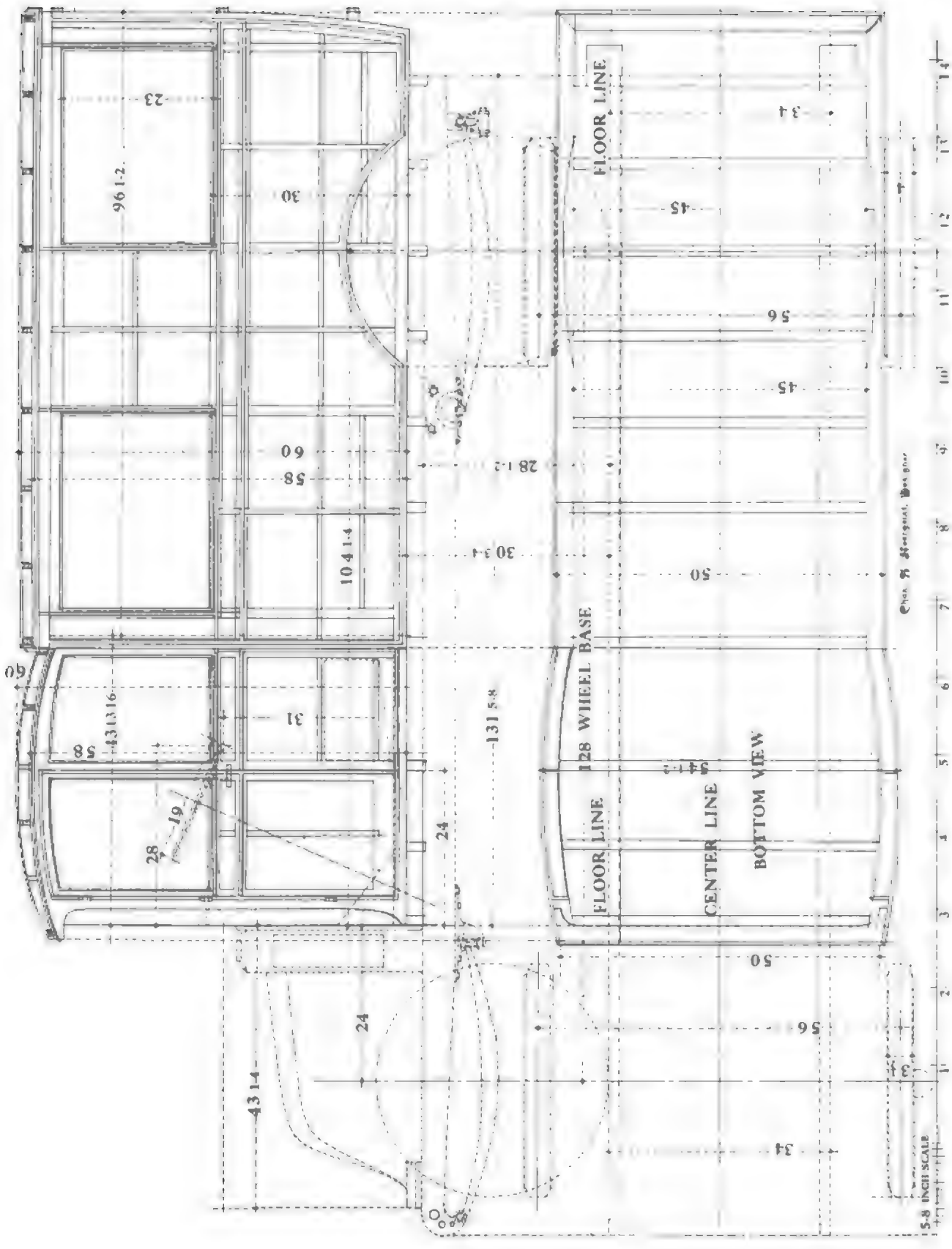
On this working draft the body from front of dash to rear end is 140⅝ inches, including



FRONT ELEVATION. BACK ELEVATION.

BUSINESS BODY WITH CAB, FOR MODEL F INTERNATIONAL TRUCK CHASSIS.

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WORKING DRAFT OF BUSINESS BODY WITH CAB. SIDE ELEVATION AND BOTTOM VIEW
(For Description, see page 29)

both cab and body, but this length depends on the required inside length of the body, and is either made shorter or longer. The shortest body is made level with rear end of frame, and the amount of turn-under is added to the body. But the extreme length depends on the length of the needed space between back of driver's seat and front surfaces of rear door. On this working draft this space is 94½ inches, but this, of course, can be lengthened and shortened to suit the customer.

The construction of this body is different from most of the styles shown in catalogs. In most cases the bodies and cabs have no turn-under, are straight lengthwise from front to rear end, have no front doors, and side quarter windows are made to shift or to drop. This is also the case with the rear end of body, which is generally close paneled and sometimes without the addition of moldings. Such construction, of course, means less work. The front doors alone take a few days, and especially so if the windows are made to drop and to be removed during the summer months. This also is true as regards the side quarter windows. They are fastened sometimes with catches, to prevent rattling, which has been found most effective.

On the main body there are two windows to drop on each side, sometimes made stationary or eliminated entirely. This, of course, is much less work if the body is closed up, but the users of motor bodies order what they want to suit their business, and in most cases the expense is secondary as long as the user receives what he wants at a fair price. On most of the bodies, if windows are made to drop, the glass frames drop generally into the corner pillars. On the present draft the glass frames drop into separate pillars, which is more labor and expense, but has advantages over the regular practice and looks well.

The spaces on each corner of the body can be enlarged if desired, and the center space on the side surfaces can be closed and molded, or it can be left for lettering if the body is built with glass frames to drop.

Such bodies generally are furnished with a window back of driver's seat, the size of which depends on the climate of the country. In the colder sections the windows are 12 x 15 inches, while in others they are 18 x 24 inches up from 24 to 36 inches. Curtains are also used instead of glass frames to drop, the curtains being made to roll up. The same is done for the rear doors. The front cab glass frames are made to drop and are lined with vehisote. This protects the glasses in the windows and presents an excellent finished surface when painted. The same can be done on main portion of the body.

Number of Pieces, Sizes and Kinds of Timber Required for a Combined Cab and Business Wagon Body

Cab Body

No. of Pieces		Kinds of Timber	Thickness Inches	Width Inches	Length Ft. In.
2	Main sills full length	Oak	2	10	11- 9
4	Bottom cross bars	"	1½	1½	4- 2
2	Front standing pillars	Ash	4½	4½	5-
2	Front door pillars	"	1½	...	5-
2	Rear door pillars	"	...	...	-
2	Center standing pillars	"	1½	...	5-
2	Rear end cab standing pillars	"	1½	...	5-
2	Side top rails	"	1⅜	...	3-10
2	Side top door pieces	"	1⅜	...	1- 9
2	Door fence rails	"	1⅜	2	1-10
2	Side quarter fence rails	"	1⅜	2	1-10
2	Door belt rails	"	1⅜	2	1-10
2	Side quarter belt rails	"	1⅜	2	1-10
2	Door bottom pieces	"	1⅝	4	1-10
2	Side quarter bottom pieces	"	1⅝	1⅝	1-10
1	Top front end cross bar	"	1⅜	...	4- 2
1	Top rear end cross bar	"	1⅜	...	4- 2
3	Cab top curves	"	⅞	⅞	4- 9
2	Seat cross rails	"	1½	1¾	4- 6
2	Seat side rails	"	1½	1¾	2-
1	Cross fence rail	"	1⅜	2	4- 6
1	Seat board	"	⅞	21	4- 6

Inside Cab Panels

1	Cab panel	Vehisote	1/9	45	4- 6
2	Door panels	"	⅛	30	2- 6
2	Side quarter panels	"	⅛	30	2- 6
1	Back panel	"	⅛	23	4-

Rear Main Body

4	Standing corner pillars	Ash	1½	...	5-
8	Standing glass frame pillars	"	1½	...	5-
2	Rear end corner pillars	"	1½	...	5-
2	Full length inside pillars	"	⅞	⅞	5-
2	Short length inside pillars	"	⅞	⅞	2- 6
2	Side top rails	"	1⅜	2	8- 6
2	Side fence rails	"	1⅜	2	8- 6
2	Side belt rails	"	1⅜	2	8- 6
1	Front top cross bar	"	1½	4½	4- 2
1	Rear end top cross bar	"	1½	4½	4- 2
6	Cross top curbs	"	1	1	4- 2
1	Rear end top panel	Vehisote	¼	53	8- 6
4	Rear door pillars	Ash	1½	...	5-
2	Upper door pieces	"	1½	2	5-
2	Fence rails	"	1½	2	5-
2	Belt rails	"	1¼	2	-
2	Bottom door pieces	"	1⅜	3½	2-
2	Door strainers	"	1	1	1- 6
4	Curved top moldings	"	⅛	¾	-
2	Curved rear top moldings	"	⅛	¾	-
2	Straight rear top moldings	"	⅛	¾	30-
	Side and rear molding	"	⅛	¾	50-

E. & M. Concealed Door Hinges

The English & Mersick Company, New Haven, Conn., as usual during the show seasons, have some important announcements concerning automobile fixtures.

The most important items this year are the concealed door hinges for open and enclosed bodies. These improved concealed hinges have die-cast cases and forged steel hooks. They are noiseless, water-tight, no strain on pin, moving center, and hanger plate covers mortise of hinge box and screw heads, making a perfectly clean, finished pillar.

They are made in two sizes; size of case is 1¼ inches wide by 3¼ inches long, and 2 inches wide by 3⅝ inches long.

The English & Mersick circular illustrates and describes two sizes of concealed hinges, with grooves on face of pillar plate; also a door window flapper of the frameless glass type; various styles of door handles, and one of the latest styles of limousine lamps. For further particulars write to the company for supplement No. 2, March 1, 1919.

From "The Speed-Stir"

A perusal of the March issue of "The Speed-Stir," house organ of Joseph N. Smith & Co., Detroit, will demonstrate how one large firm is helping to stem the tide of radical propaganda directed to workingmen. Free life insurance and a shorter work day without reduction of wages are features of a plan just put into effect in this plant.

Part E——Lesson 23. Obtaining Lengths, Widths and Shapes of Seat Panels

(Continued from pages 26 and 27, March, 1919, of "The Vehicle Monthly"). (For description see page 33).

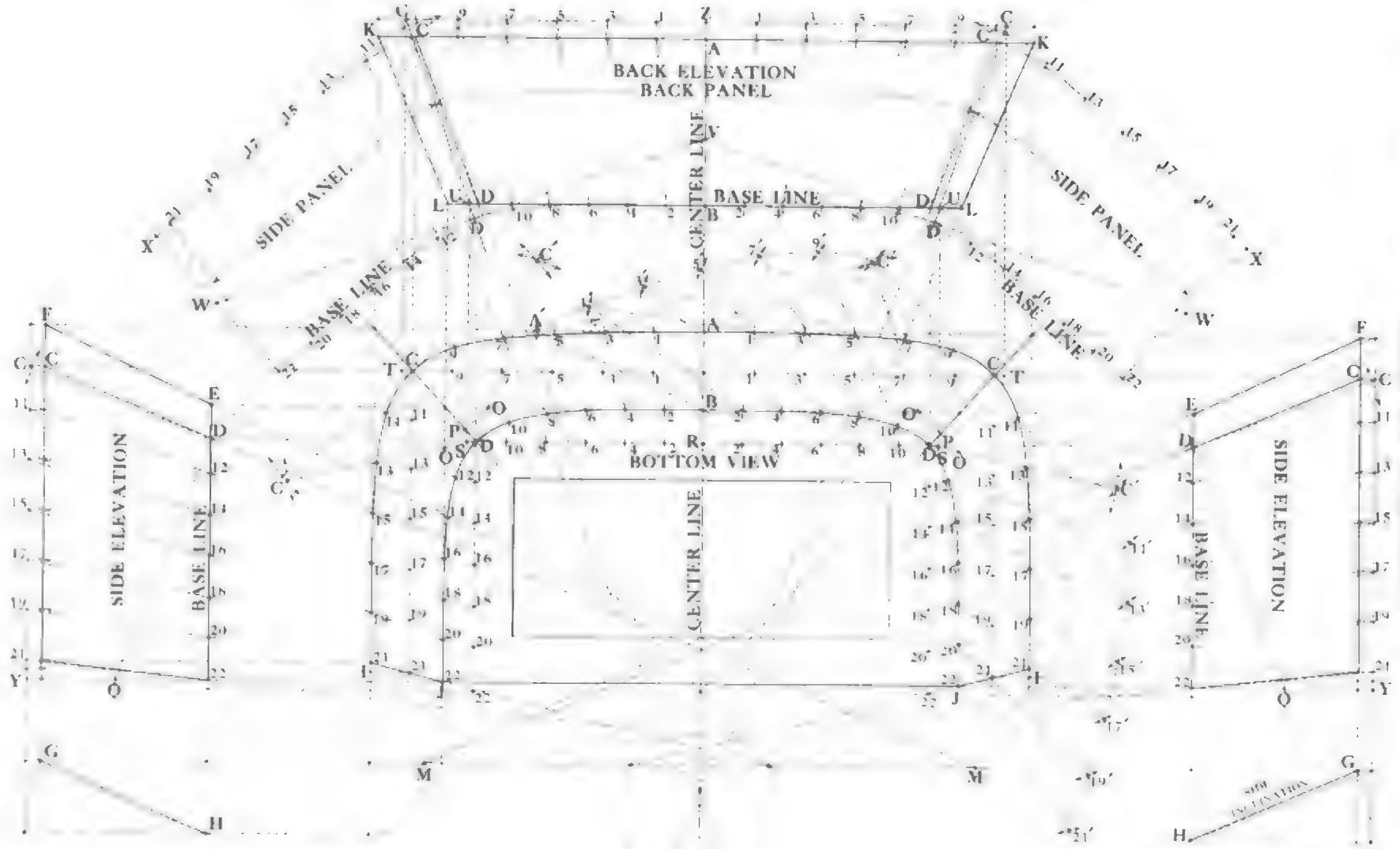


Fig. 23

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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Heergeist, Technical Editor and Draftsman of "The Vehicle Monthly."

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Subjects Treated in Previous Numbers

Part B—	Lesson	1	Laying Out a Plain Board Seat	Part E—	Lesson	13	Panels on Inclined Square Cornered Seats
"	—	2	Framing a Four-Cornered Seat	"	—	14	One-Piece Metal Seat Panels
"	—	3	Framing a Round-Cornered Seat	"	—	15	Shape of Panel Taken Direct from Bottom View
"	—	4	Laying Out and Framing a Two-Passenger Seat	"	—	16	Laying Out a Square Cornered Spindle Seat
"	—	5	Laying Out and Framing a Twin Seat	"	—	17	Seats with Straight and Inclined Surfaces
"	—	6	Constructing Round Cornered Seats with Strips and Boards	"	—	18	Round Cornered Seat Panel with Vertical Surfaces
"	—	7	Constructing Round Cornered Seats with Horizontal Joints	"	—	19	Obtaining Lengths, Heights and Curves by Triangulation
"	—	8	The Laying Out of Proportional Corner Curves	"	—	20	Obtaining Lengths, Heights and Curves by Triangulation
"	—	9	Establishing the Concave Surfaces of Seat	"	—	21	The Creation of Bottom Curve, Length of Spindles and Position of Rails on Bottom View, by Intersections
"	—	10	Length and Shapes of Concave-Convex Seat Strainers				
"	—	11	Length of Spindles on a Round Cornered Seat	"	—	22	Diagram of a Round Cornered Seat.
"	—	12	Lengths of Seat, Spindles and Position of Rails	BACK NUMBERS CAN BE HAD FROM THE PUBLISHERS.			

Part E——Lesson 23

Obtaining Lengths, Widths and Shapes of Seat Panels

(For Working Draft see page 32)

EXPLANATION. Fig. 23. The construction of the diagram is same as Fig. 22, except a difference in inclinations and the numbers will explain the points on elevations and bottom view. All the shapes of seats and similar panels have been obtained in previous lessons by the triangulation method, but on this diagram and Figs. 24, 25 and 26 the shape of panels is obtained direct on the lower front ends of panel; including all the points from center line to lower and upper front ends, and lengthening. This method is more simple and more correct than any other used at present. This same method is also applied in its simpler form on square cornered seats on Figs. 14, 15 and 17.

OBTAINING THE SHAPE OF PANEL ON BACK ELEVATION.

Horizontal lines A, B, on back elevation represent the seat when both base and top edge of seat are horizontal. A B on bottom view represents the amount of back inclination as shown on E F, side elevation, and G, H, is the side inclination at front end of side quarters. Points I, J, either side of center line, bottom view, represent the same amount as G H, and also K, L, K, L, on back elevation. From these points I, A and J, bottom view, the curve is made with either more or less rounded corners. Square up points I J, bottom view, to points K, L, back elevation; also connect horizontally points F and F' and points E and E, from one to the other, on side elevation. Make diagonals from corner to corner, creating C, D, either side of center line. Square over points C, bottom view, to C C, side elevation, and C C, back elevation, either side of center line. From these four points connect with points M, M, and N, N, thus points D, D, D, D, on base lines of seat, back and side elevations, are obtained. Square down in a vertical direction points D, D, from base line, back elevation, to points D, D, bottom view. Also from points D, D, side elevation, to D D, bottom view; thus creating the outside bottom corner of seat frame. From these angles the diagonal lines C, D, either side of center line, are made.

Put triangle on diagonal C D, on point C, bottom view, and square over from C to C' C'; take height of seat as explained before and from C make points C', C'; from points C', C' connect with D D. From these intersections of C' C' to D, vertical line J, L, and horizontal line E, E, make points O O and point P, either side of center line. This space from P to D we need for the panel curve and it is a very important one, same as diagonal line C, D.

Square dotted line C D, side elevations, from point D to point Q. Take the six spaces from center line at B to point D and space off from point E, center line to point S. Do the same from point A, center line to point T. Square point S, bottom view, up to point U, base line on back elevation, and point T, bottom view, up to point C, back elevation. Heavy line C D, back elevation, is the lengthened line, and will fit to curved lines A C and B D, bottom view. Take space between points P D, bottom view, and place it from point U to point D, back panel. Lay triangle on dotted line C D, back elevation, and square line V W, passing through point D. Lengthen curved line from point D to point 22 and curved line from point C to point 21, bottom view, and place it from point D on the lengthened line to point 22 and from point C on line A, back elevation, to point 21. Connect point 22 with point X, side panel, take distance from point Q to point 22, side elevation, and put it from point W to point 22, side panel, and make straight line from point 22 to point U. Square line 22 and X with point U and point 22. Take space between points 21, Y, side elevation, and put it on point X to 21, side panel, and connect both. Take height from point 22 to point Y, side elevation, and put it from point 22 to point X, side panel. Take back inclination from point E to point F, side elevation, and put it from point B to point Z, back panel. Draw horizontal from point Z to points C C; connect point X with point C on line Z. Take length from C' to D, bottom view, and put it on points D to C', back panel. This gives the length and width of the panel and the shape is drawn in as per dotted lines. All the various widths of the panel on divisions are shown on A'-B, 1'-2, 3'-4, 5'-6, 7'-8, 9'-10, C'-D, 11'-12, 13'-14, 15'-16, 17'-18, 19'-20, 21'-22. With these widths the curves can be completed. What are most needed are points X, 22, side panel, D, C', bottom view, and Z, B, back panel; also space between points W and 22, side panel. The other half of the panel is exactly same as the one explained.

PROBLEM. Fig. 23. Cut side and back inclinations on a block, the same widths and curves as shown on bottom view, mark all the division lines, top and bottom, square the front end of block, lay a paper around it and pick up all the marks; lay it on back panel, Fig. 23, as both must be exactly alike. The diagram looks complicated, but for practical purposes all the lengthenings of the back and side panels, top and bottom of panel, are indicated only by points, besides only one-half of the diagram is used.

PART E—LESSON 24, WILL APPEAR IN THE MAY NUMBER OF "THE VEHICLE MONTHLY."

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Painting and Finishing

Painting and Lettering at the Shows

By M. C. Hillick

There are some lessons taught by the recent automobile and truck shows, notably those held in New York, Chicago and Philadelphia, that cannot fail to be of practical interest to the motor vehicle painter.

For one thing, it is clear that there is a firmly grounded determination to depart, to a decided extent, at least, from the severity of the shades clearly dominating the domain of colors during the war.

This does not necessarily indicate that the deep blues and greens and maroons, and sombre browns, and dark-visaged grays, and the fairly wonderful combinations of dark pigments given polite names by their makers, are to no longer reign lavishly and compel widespread admiration.

It does mean, however, that there is to be a pre-emption of some good part of the field by other colors of a lighter and gayer tone.

Perhaps this will be welcome news to many painters and to an equally large number of vehicle owners and users, for of this latter class there is a formidable percentage who are disposed to adhere to the strictly fashionable so long as the decrees are unalterable, but are nevertheless more than pleased to step from under the yoke the moment permission is granted.

A great number of painters will be glad to be allowed to wander in the field where a larger variety of shades and tints and tones are to be found; they draw inspiration and delight from the opportunity of using and fashioning pigments and combinations of pigments having lighter and fancier tones.

It will therefore prove pleasing information to all such, to be assured of a good amount of leeway in the matter of color, choice and selection, of striping designs, ornamentations, etc.

This need not be accepted as a license for lowering the standard of the finish for the vehicle equipment, as possibly some craftsman may be disposed to take it, for so far as the writer's observation goes, the high standard of the finish maintained for the horseless vehicle during a long period of years promises to remain a pre-eminent feature.

It may be that the high quality has during the war, and in the absence of many highly skilled artisans, fallen off a fraction, but this scarcely apparent easing away from the peak of high quality in finishing may be classed as only temporary.

It would be a most technically exacting critic who would pause to complain of the quality of the finish displayed at the various exhibitions of cars and trucks lately held in the two cities mentioned above, and at other points throughout the country.

Show Painting Displayed High Qualities

At the shows alluded to there were many examples showing the car body in blue, green or maroon, with gear black, and wheels finished in the natural wood, or ivory, or white, red, etc. This feature distinguished the exhibits at the shows last year, and it indicates that the public very much liked the combination.

Beige brown, deep carmine, royal green, olive green, coach painter's blue, India blue, Brewster green, beaver brown, silk green, French blue, Rolls-Royce blue, Columbia blue, marine blue, golden olive, royal blue and periscope blue are some of the fine and fetching colors displayed at the shows in question; these colors, and many similar ones, are likewise to be seen on the streets and thoroughfares of town and country in practically all parts of the United States. Many of them are in the lighter shades, which denotes the departure from the severely sombre to the gayer and more joyful pigments already noted.

The running parts have, in many cases, lighter shades of the same colors, with the wheels going natural wood finish in a good number of examples, or in colors entirely distinct from those selected for the body or running parts.

Striping Gave Good Results

The lining work, as usual with the American vehicle painter, is being done with marked ability and a regard for accuracy and deftness of results quite the equal of anything previously accomplished. Choice of lining colors is being made with a fine regard for the artistic possibilities of the colors selected for the vehicle body, and running parts.

The Two-Line Stripe

As noted last year there is a decided tendency for using the two line stripe, which on the larger cars affords pleasing results. This two line stripe serves to heighten the field color effect without disturbing the surface outline or giving it an appearance of heaviness which it does not possess.

The double line work on the smaller car surface must be most judiciously employed, if at all, otherwise the surface is likely to convey an overloaded appearance. To a considerable extent, it must be admitted, the field color will determine the possibility of using the single or two line stripe. For example, the black surface shows a diminishing size effect and the two line stripe would more nearly give it an over-loaded effect than the same stripe would give, say, a maroon, or brown, or gray.

In truck painting the apparent intention is to utilize the varied protective pigments regardless of their special qualifications as fashion plate specimens, although there are everywhere most wonderful creations in pigment coloration, with striping and lettering that are examples of amazing range and advertising efficiency.

Pictorial and Lettering Features

As a matter of fact, advertising efficiency is through force of circumstances a main asset of the painter's work in developing the finish upon the truck and commercial vehicle today, as the recent Madison Square Garden and Sixty-ninth Regiment Armory exhibits most worthily demonstrated. The pictorial and lettering features on many of these big trucks and delivery vans represent "high art," if you will, in at least one department of its estate. Not alone at the different shows do we see these splendid examples of artistic lettering and pictorial embellishment; along the streets of almost any large city are daily exhibited admirable examples of the sign writer's and pictorial painter's skill and discrimination.

A Developing Opportunity

To compete in this field of work the motor vehicle painter must give close attention and study. This field is a rapidly developing one and if the painter located in the smaller, but nevertheless enterprising cities of the country, expects to handle the branches of the business which promise most for the future, he may well include as much as possible of the pictorial and sign writing end of it.

Perhaps he may not hope—nor may he be justified in hoping—to become the artist which these truck and commercial vehicle shows give conspicuous notice of, but as much attention to the work as time and business will admit would seem to be a step in the right direction.

It is true that the lettering executed upon these delivery vans and trucks is distinguished from the average work of the professional sign writer to a marked degree and for this reason, among others: For the most part this work must be read fairly at a glance. Hence to be comprehended and correctly sensed, the lettering at least must be so simple in character and design that it may be read at a sweep of the eye.

Today, as never before, perspective effects, height, width, thickness of lines, etc., must be studied; simplicity in both design and setting and in all the elements which unite to make up the letter in its complete form and relation to the entire presentation of the subject matter cast upon the surface, must

be attended to, if the work would be made instantly legible.

This lettering may be surrounded, as it usually is, with pictorial effects, ornate, and calculated to rivet attention to the truck owner's business, but these effects should in no wise obstruct or interfere with the readability of the letters.

Space limitations are a severe handicap to the letterer working upon the truck or delivery van. To surmount these difficulties must be the aim of the workman. In all these particulars the truck shows have furnished illuminating lessons.

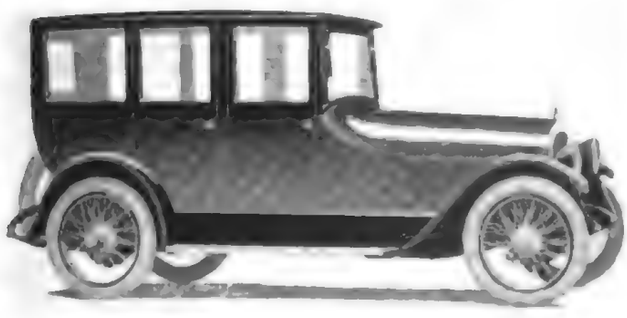
Methods of doing work are being changed; the use of materials, with direct reference to making them go the farthest and produce the maximum results. Safety first is being practiced as a means of conserving health and rendering man power more productive. All these things are working out for the good of the business painter, and it will be the means of preventing him from ever going back to some of the old ways which this great world war has learned him to discontinue.

For one thing, he has been taught through necessity to do more of the surfacing of work in the earlier stages of the process where it

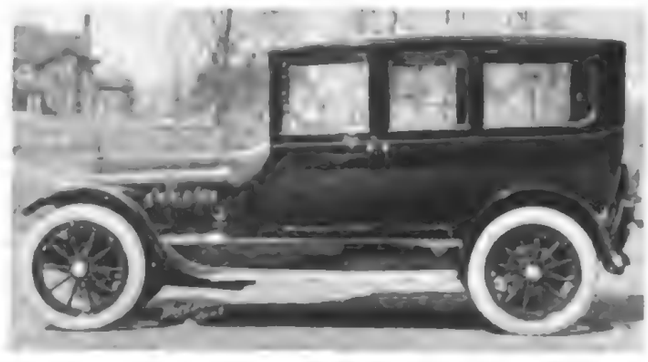
to the durability or appearance of the work. By making a particular process more exhaustive and complete, the second one, not infrequently, may be discarded altogether. For example, puttying work may be completed at the first operation by simply making the inspection most thorough. Thus by taking advantage of the opportunity, as it presents itself, economical practices develop.

Making Each Process Complete

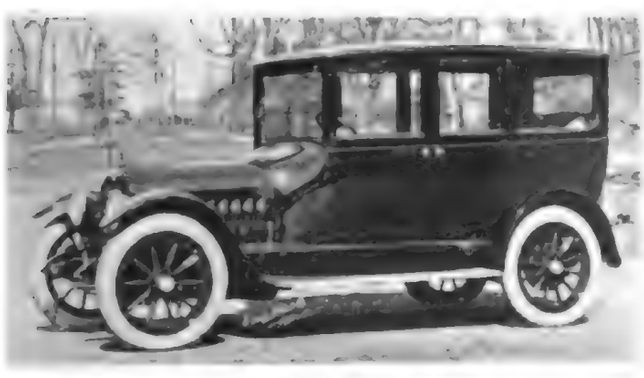
One of the essential things in connection with the painting and finishing of vehicles



SEDAN, WITH WIRE WHEELS.
Haynes Automobile Co., Kokomo, Ind.



SEDAN LIMOUSINE.
Peerless Motor Car Co., Cleveland, Ohio.



PEERLESS SEDAN.
Peerless Motor Car Co., Cleveland, Ohio.



TOURING CAR, WITH WIRE WHEELS.
Haynes Automobile Co., Kokomo, Ind.

Economical Practice

The war has brought about an era of high prices almost startling in their extremes, both in the matter of labor and material. To speak modestly, we may say that paint shop supplies have advanced within the year fully thirty-three per cent. in price, and in the case of some materials the price has advanced more than fifty per cent. In a few instances, at least, the advance has been nearer seventy-five per cent. Labor has also advanced by leaps and bounds, and even at the high wage offering it is scarce, and in many cases simply not to be had.

These conditions, facing the automobile and carriage painter engaged in business, are giving him much concern, and have likewise resulted in creating a determination to most rigidly practice the sharpest sort of economy.

may be performed at less cost both in labor and material. The priming coat, and the coats coming immediately after, are being given the attention which they richly deserve, and which at a former period by many exceedingly expert painters were neglected until the varnish coats came along.

Labor to handle these coats, to surface them, to putty, and refine them, brings less in the market, unless it is a market strictly controlled by organized labor, than does the labor of refining the coats which come after the application of the color. Material will also be found to cost less for the surfacing coats up to and including the roughstuff.

Then as to the methods of bringing up work to the finish; it has been found by some painters, at least, that an operation here and there may be discarded without any real loss

consists of making each individual process a complete unit of the whole. It used to be the practice among not a few otherwise good and efficient painters to treat the various processes as merely a minor part of the entire job and as having no independence of its own. This practice was often fraught with dire consequences, and seldom proved adequate in meeting the requirements of the case.

The importance of each process has long been recognized by expert workmen the world over, and this recognition granted to such processes is of itself sufficient to justify the claim, set forth by men who have given long study to the matter, that each process in a sense is a law unto itself and must be complete in its organism and in the various elements composing it; and while interrelated to all the other processes, it must nevertheless

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have enough independence of its own to stand out and bear its own burdens if need be.

Naturally, to this independence must be added a relationship to the other processes, and a unity of action and a capacity for wear and tear, making them mutually helpful to one another. When we get this relationship and what it means so far as the individual processes are concerned, well fixed in mind, it will enable us to work along a line of less resistance and to overcome some disadvantage which have hitherto proved stumbling blocks.

Take a coat of color, or of varnish, for example, and the work of applying it, the material and the work of applying it, constituting the process. This coat of material when properly prepared and applied marks a distinct and complete step towards the completion of the finish. It should be capable of doing certain things in the economy of the finish which no other coat or application of material is qualified to do, and to this extent it is a perfectly independent unit in the assembled body of elements composing the finish. And this independence should be granted it and be recognized and respected, and all the work applied to the job should be developed with this thought in mind.

In this manner better results must be had because a main reliance is put upon each individual coat and process; and when this is done more thorough attention will be given to the preparation of the material and to the process of applying it, and in the end we shall have the better wearing and nicer looking surfaces.

Painting a Car Aluminum Color

A subscriber in Central New York asks for a method of painting a body in aluminum color with gold stripes.

REPLY

Our correspondent fails to state whether the car body is wood or metal, but in any event the first essential, whether wood or metal, new or old work, is to make the surface as smooth and level as it can possibly be made. In fact, the ground color, in its final state, should be as smooth and clean-cut as the aluminum color must naturally be.

Any defect discovered after the aluminum color is in place cannot well be mended; all this work, then, should be taken care of while the ground color is being brought up, so that when the surface is pronounced ready for the aluminum, it may be entirely free from defects.

As to the shade of the ground color; it may be a blank white ground, as some very able painters prefer to have it, or it may be made, as the writer chooses to make it, a very light gray—simply pure white shadowed with a bit of coach black to give it an aluminum cast.

This color should be finely ground and prepared and worked out free and fine under the camel's hair brush to the number of coats, to insure a perfectly solid ground color. Any ridgy or brushy effects allowed to develop in the surface are certain to show when the aluminum is applied.

Having secured the necessary solidity of color in a clean and good condition, next proceed to apply a thin coat of elastic rubbing varnish to the entire surface; possibly the varnish will need a bit of thinning with turpentine. This will have to be determined by the workman, and it will need to be attended to before commencing to varnish the car. It had best be seen through testing the varnish about how long a period of time must elapse in the prevailing temperature of the room before the varnish is in a fit condition to take the color.

If the varnish is applied in the early morning, with a fair and uniform degree of heat prevailing in the room throughout the day, it should be quite tacky enough in the late afternoon to receive the dry aluminum powder and hold it securely as it is sifted on or dusted on with a tuft of cotton, which is the best method to use the aluminum in order to get the desired luster and finish of the color.

For a large surface, and to get rapid results, a flat camel's hair brush, 2", or 3 inches wide, will be found the correct tool for use in applying the powder. With this tool the work may be carried along very fast and successfully.

After dusting on the aluminum it should be allowed to stand for several hours over night, in fact—for the varnish to more thoroughly harden and to take up the aluminum to the fullest extent. Then with a tuft of clean cotton, free from all foreign substances, the aluminum surface may be gone over and polished lightly and sufficiently to fetch out the bright and lusterful burnish of the color.

Much of the success of painting an aluminum finish in this manner depends upon the skill and care exercised in applying the varnish or size coat. Any run or wrinkle or slight defect developing in the varnish during its application, or the flowing out of the material after application, is sure to be seen when the polishing process is taken along.

Upon this surface cast the gold stripe, or any other striping colors, after which apply a coat of hard-drying, water-white varnish, as a protection to the aluminum and to the striping effects. If it is desired to have the finish served in a dull effect, as the finish is frequently seen in New York and other large cities, it will need to be lightly and uniformly rubbed with water and pumice stone flour to the extent of subduing the luster completely. This process will develop an absolutely dull effect.

To bring out a flush of mellow gloss to the finish, after thus rubbing, give the surface a gentle polish with sweet oil and rotten stone, using a piece of broadcloth or a piece of soft felt. The main thing in all this work is to adjust your processes to adequately meet the delicacy of the color and to counteract its tendency to show the slightest irregularity in the finish.

Spraying System in Finishing Motor Car Bodies

A subscriber writes: "We wish to inquire whether the spraying system of painting and varnishing autos is a practical proposition in a general repair shop."

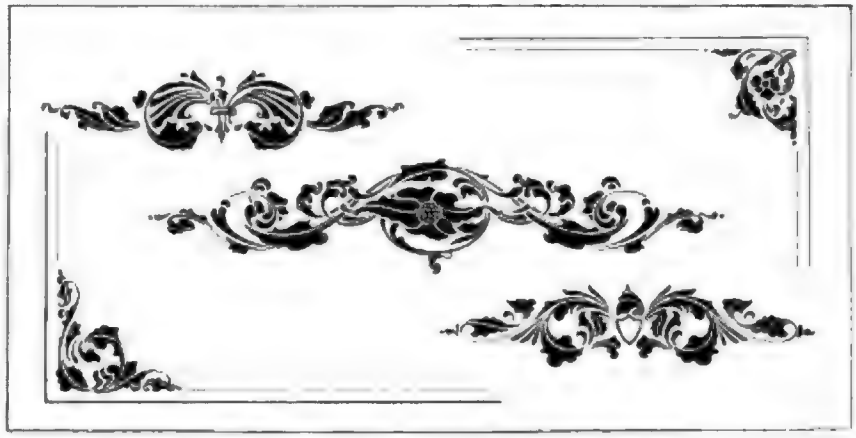
REPLY

We can see no reason why the spraying system of painting and varnishing cars sent to the shop for general painting repairs cannot be employed as successfully as it is today being employed in many of the largest automobile factories, in cases where the trimming and upholstery furnishings are removed.

In at least one automobile paint shop adjacent to New York, taking care of repainting work solely, the spraying system of painting and finishing cars was being practiced most successfully some five years ago, and we believe that not a few shops devoted to the car repainting, both in the East and the West, are using the system successfully in whole or in part.

In a large railway paint shop with which the writer is acquainted, a paint spraying machine, or atomizer, is most successfully employed even inside the coaches, for spraying the enamel and finish on the luggage baskets and metal fixtures attached to the interior.

Personally, we believe that the spraying system of painting and finishing automobiles has a large field for practical and useful occupation, and that it is destined to prove an important feature of the repainting business.



Some Useful Scrolls for Commercial Body Ornamentation.

Upholstery, Toppings and Mountings

The Art of Motor Car Trimming

It has been truly said that the automobile or carriage trimmer must "quilt like an upholsterer, stitch like a harness maker, and sew like a tailor." It is just as necessary that he should have good taste and a knowledge of design, proportion and color. The materials he uses are among the most costly of those employed in the factory and require great care in storage and in working, to avoid waste. So there is a great deal for the young automobile trimmer to learn before he can consider himself an expert.

Mr. Newcomb's series of articles, now running in "The Vehicle Monthly," are intended to cover the whole subject of automobile upholstering. He has taken up the art at the beginning, and as the series proceeds will impart to his readers many useful hints and helps, as valuable to most journeymen as to the average apprentice. The series will conclude with the selection of several typical cars, for which Mr. Newcomb will furnish complete trim instruction from the start to finish.

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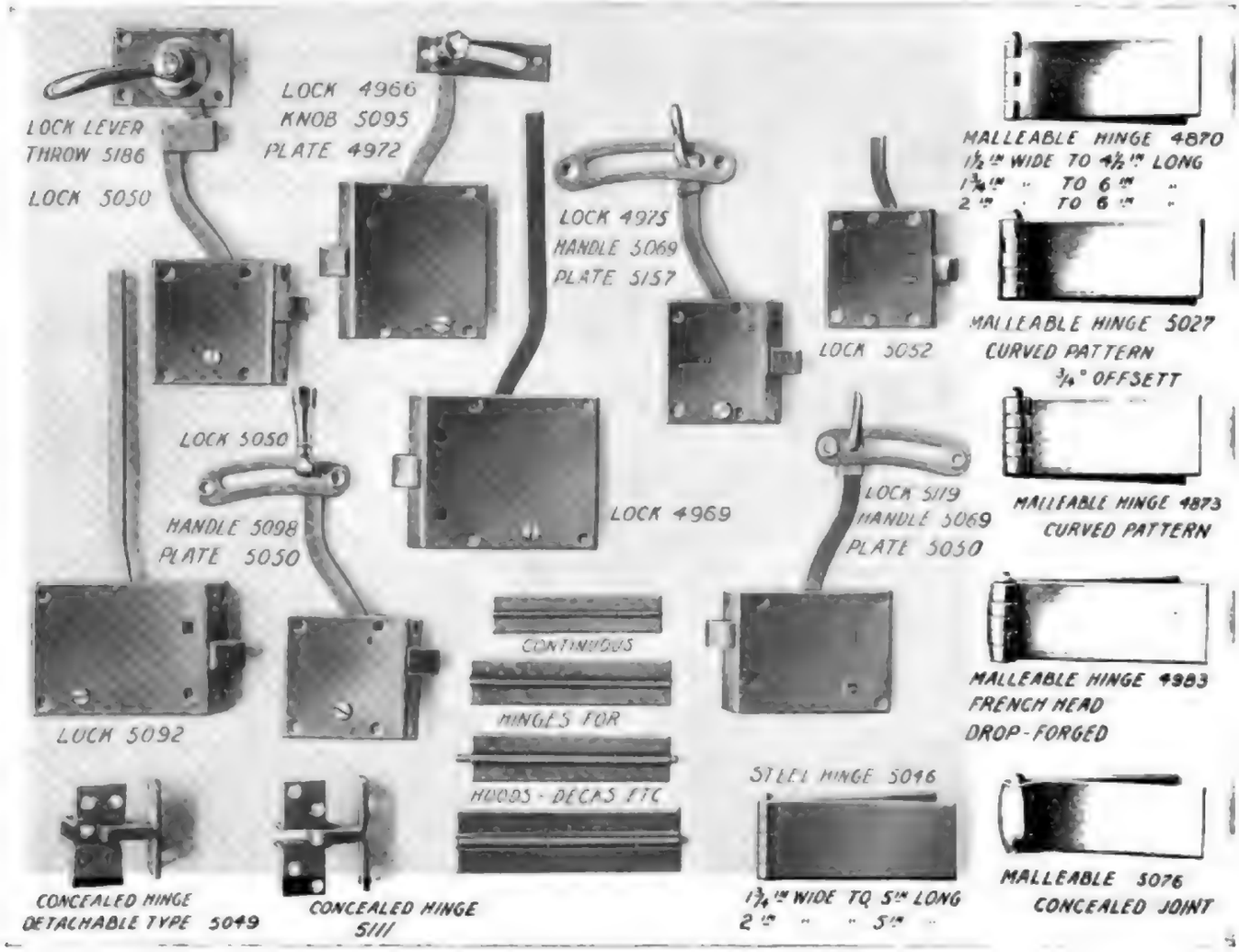
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AUTOMOBILE MOUNTINGS

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Upholstery, Toppings, Mountings

The Art of Motor Car Trimming

A Series of Articles by an Experienced Trim Shop Superintendent, Designed to Assist Young Trimmers to a Knowledge of the Fundamentals of Motor Car Upholstery

By Joseph A. Newcomb

SIXTH ARTICLE

This series began November, 1918. Back numbers can be obtained from the publishers.)

The Laying Out and Making Up of a Back

The fitting of the pattern for the back is done in two ways, either by fitting over the springs or simply to the frame. Fitting over the springs probably would be the better method for custom work, but allowances can be made without the use of the spring. The average amount of "take-up" is about two and one-half inches, so if a pattern is made or fitted to the frame this amount of allowance should be made for the "take-up" of the spring.

The material from which the pattern is to be made is tacked temporarily over the spring construction, the outer lines where the finish is required is marked while in position, at top, bottom and sides, allowance being made on the sides for the thickness of the quarters. Calculation is then made for the outer line of piping, which is arrived at from the bottom. The average position for this point is about four inches from the center of the radius at the seat board. Thus we have found our objectives, which are the top finish, the seat board where the back comes in contact with the quarter, and the outer line of piping. The pattern is then removed, the center is marked, and the dividing of the width of the pipes from the outer line gives the width of the pipings. We should work at all times from the center in laying out the foundation for both the back and cushion.

In diamond tufting the first row of buttons should average five inches from the top. From the top line of tufts to the point of the diamond should average three and one-half inches, and the bottom lines of tufts should be placed about three inches above the top of the finished cushion.

The fullness required across the back varies as in the cushion, one inch being the average. The fullness between the points at the top of the back averages three-eighths of one inch. Fullness from the points to the bottom line of tufts varies according to the contour required, from one-quarter of one inch for a flat back to one and three-quarter inches for a full back. (Refer to drawing for correct method of laying out of back, in March number.)

The fullness pattern is determined in the same manner as the foundation pattern, being an exact duplicate, with the addition of the fullness required, and the amount of goods required for a turn-under at the side and a finish for top and bottom.

The patterns for diamond tufting, when completed, are made up on a frame in exactly the same manner as the cushion top, with the difference that the top and bottom are left open and closed in with the hanging of the back. In laying out of both the back and the cushion we are working always from the center lines, working to the center in the hanging of the back and the building of the cushion, following closely the lines of the foundation patterns.

In the hanging of the back the center is marked on the seat board; the foundation pattern is measured to ascertain the distance between the outer lines for the piping, which is marked on the seat, and the lines of the back are caused to conform with these measurements when hanging the back. The same method is pursued in the building of the cushion, thus causing all the plaits to conform. It is the purpose in this article only to give methods, descriptions and examples, without the complete trimming of the job, taking only into consideration that these instructions are intended primarily for beginners in the art of automobile upholstery.

There being various styles in which diamond tufting can be used, I will submit drawings showing the half-diamond pipe back and a full-diamond pipe back, a back made separately with separate side quarters and a one-piece back running from door to door. In making the one-piece back I will call attention to the proper method of making the pattern.

Owing to the fact that in a one-piece back the lines are drawn absolutely square there will be a tendency to have the appearance of the line not to be square up. This is an optical illusion. While the lines will appear to be out of plumb, it is caused by the cantour made by the springs. So to overcome this illusion, while laying out our pattern, we contract the outer line marked inside the radius of the seat at the bottom, three-eighths of one inch for the first line, one quarter for the second line, one-eighth for the third line, the rest of the lines for the pipes to the center being square up.

This method being followed in the laying out of the back pattern in one piece will permit of easy back hanging, especially where many jobs are being built for an order. For large output the first pattern as it is laid out may not be absolutely correct, but while the first back is being hung deductions can be made, the pattern can be altered and will suffice for an indefinite number of jobs.

On large outputs particular attention should be paid to the amount of wastage. This should also be deducted from the original pattern. I am calling attention to this fact as an economic example, for an inch wasted here and there is not an economical proposition. The beginner should bear in mind these facts, for a dollar saved by the firm which employs him means a more stable position for himself as well as securing credit for his efforts.

It has often been questioned, "is a one-piece back and quarters as comfortable as one made in three sections?" What I have learned from experience is that there is as much comfort and satisfaction in a one-piece construction as in a three-piece construction.

On a one-piece back running from door to door, the radius at the corners will be maintained permanently, while on a back made in three sections, viz.: back proper and side quarters, being free at the corners, has a tendency to sink in and become square and lose the radius altogether, causing a hollow to be made to which the body will not conform. I am mentioning this as an example, for the reason that invariably a person riding in a car will endeavor to seat himself comfortably in the corner, and after all fair deductions are made, even after taking into consideration that a one-piece back may be air-bound, we still find that the one-piece back has the advantage, because outlets for the air can be provided by the use of grommets below the top line of the cushion, these grommets, of course, being concealed from view.

Sensible Spring Construction

Much of the success attributed to a trimmer as to comfort depends on proper spring construction. The utmost care should be taken to have properly fitted springs of the proper construction. There have been many patented springs placed upon the market, and these have given more or less satisfaction. Freak spring construction is seldom satisfactory. The height of the spring determines the gauge of the wire to be used in the making the spring. The spring must have a suffi-

cient resistance to take the bound and rebound and yet be resilient enough to permit of comfortable riding. The day is past for a trimmer to create his own spring construction and he is relieved of this effort by the spring manufacturer.

In fitting spring patterns, care should be taken that the spring does not bind, either at the back or quarters, and it should have a pitch or an incline toward the rear, on the cushion spring. The average pitch required in present-day construction is three inches. The reason for having the pitch is to incline the rider toward the back, and the back spring should rake toward the top.

This combination in spring construction permits of the utmost comfort. The use of too much hair, or making the back pad of the cushion pad too thick, drawing down the cushion too tight or hanging the back too tight, will cause the springs to lose their effect, making them stiff. The springs should always have their full freedom so that the maximum of results may be attained. Back spring construction is so made that there is no shifting permitted, and no tying in of springs is done. This condition permits of rapid back hanging.



INTERIOR STUDEBAKER LIGHT SIX SEDAN.
Studebaker Corporation, Detroit.



INTERIOR OWEN MAGNETIC COUPE.
The Baker R. & L. Co., Cleveland, Ohio.

Negligee and Plain Work

Negligee work, which is considered by many people the finest, most beautiful and most comfortable upholstery, is today almost entirely unknown to the majority of mechanics. The beauty of this style lies in the fact of its apparent looseness, the graceful and natural folds of the goods showing the application of real mechanical skill.

The laying out of patterns for negligee work is done practically in the same manner as the diamond tufted work, but with this difference: There is no plaiting, fullness need not exceed three-eighths of one inch, and the diamonds are made considerably smaller. Cushion tops are made almost invariably with a corded edge and plain facings.

In the making up of negligee work in order to get the extreme effect it is necessary that the cloth should be lined with a layer of cotton wadding and muslin. The cloth, after being cut out, is laid on the bench, back up; the punch marks for the buttons are touched lightly with paste over which a layer of cotton is placed. The outer edges of the cloth are also pasted just beyond where the cord is intended to be sewed. The cotton is trimmed off just inside this, pasting at the outer edges, and the muslin backing is laid over the cotton. Care should be taken that none of the three pieces of material is stretched, thereby allowing each section to have an equal amount of fullness, so that when the tufting is done each piece of material has an equal amount of play. This section is then laid aside for the paste to dry.

The foundation pattern is laid on the covered frame, marked out exactly the same size as the foundation pattern. Two layers of hair are laid on the frame and the outer covering laid over the hair, held temporarily in place by the use of upholsterers' pins. The buttons or tufts are pulled through at the points indicated on the pattern, drawn very tightly, tied fast and with the use of a tickler creates an indentation along the lines from button to button. This causes the impression of a line between the diamonds. Pat lightly with the hands all over the top, thus flattening out the hair. Use a regulator through the back to work the hair up to the button. Very often it is required to use a stuffing rod in order to fill up any hollow that may be caused by the shifting of the hair while working up the pad.

After this has been done draw the outer line of plaits firmly to the outer edges where the cord finish is to be placed. The goods between the outer lines is to be left natural and the sewing is done by hand around the cord line, sewing the cloth to the frame covering. The stitching is done the same as a basting stitch, up and down, in spaces of about one-half inch, not back stitched under any consideration. The up and down stitch causes an indentation which gives the negligee effect. The back stitch would cause the appearance of a series of small plaits, and this we must avoid, otherwise we would not create the negligee effect.

No creasing or ironing is required, for in order to get the negligee effect there must be no plaits formed, and the material must find its natural position to create the negligee effect.

The advantage of negligee work is that after use it usually improves in appearance, proving that the goods must find a natural position in the make-up. Negligee work properly executed is very attractive and serviceable, and always excites admiration.

After the top is sewed in the above manner the facing, with a cord attached, is sewed by hand around the lines which have been basted. The sewing should be done by the well-known trimmer's back stitch. The back stitch adds more strength and will not affect at this point the negligee effect.

In making up the back the outer covering is made in the same manner as described in the cushion top, but in making up the back foundation a pad is required before the outer covering is placed in position. I will describe the method of making this back on the frame, as all negligee work is framework.

The frame being covered, the pattern is marked thereon; a pad about two inches thick is made of sufficient size as indicated in drawing. The pad should be made extending a couple of inches beyond the point where the buttons are to be placed, that is, top and sides. At the bottom of the back the pad should finish a half inch above the bottom line of

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buttons. The pad should be flat and loosely quilted through, thus keeping the hair permanently in position.

Over the pad is piled hair the size of the pad; over the hair is place the outer covering. The buttons are drawn through, and care should be taken that the buttons are drawn perpendicular to the marks indicated for the buttons on the foundation, because if the buttons are not drawn through the pad properly there will be a variance in the fullness.

The two top lines of tufts are drawn down just so far as the pad. The bottom line of buttons, as I have already indicated, are to be placed below the pad, which allows the bottom line of buttons to set deeper than the upper line, thus giving a square effect and causing a back to be made that will hold its original shape indefinitely.

The buttons being tied secured in position, we will finish the sides and the bottom. The body of the back having the lines regulated into position and the hair worked up smoothly, the bottom is drawn down to the finish line and basted. No hair is required from the bottom line of tufts to the bottom finish, thus permitting this section at the bottom to be flat, which allows the cushion to extend under the belly of the back, permitting more cushion room and giving the benefit of the maximum of space.

That section of the side between the pad and the quarter line is filled in with hair and the cloth is basted down at the quarter line, indicated from the top to the bottom.

The foundation is cut from top to bottom and the surplus cloth is thrown around and basted to the rear of the back. The top of the back can be finished in the same way as the bottom by basting in position, or it can be left open and closed in when hanging the back in the job, but often the closing in on the frame can be accomplished with less effort and requires much less time in hanging.

The making of the quarters can be done either on a frame at the bench or it can be made up on double-ply buckram as a foundation and can be finished in the job. The fullness can be worked in by the tacking at the finish edges. The above description is for separate backs and quarters.

Fitting and Making Head Lining

Owing to the fact that different weights of cloth have a different amount of stretch, the measuring of the spacing of the ribs is not practical. The simple method is, after the cloth is cut of sufficient size, the ribs to which the listing is to be attached are selected. The cloth folded to the center is tacked temporarily at the front and the back and the ribs as selected, and marked at the selected ribs where the listing is to be placed. The folded cloth is laid on the bench and the lines squared across from the center. Lines are drawn, to which the listing is to be attached, and the listing is sewed either by machine or by hand, by "shot stitching." This method of fitting is simple and takes out just the amount of stretch required.

Where three ribs are used for the listing we must tack to the front or back of two ribs and to the opposite of the third selected rib, the center rib being tacked to first, and the first and back ribs last. The finishing around the front, back and sides should be carefully executed, as the sewing at the listing must be kept straight. The main part of the stretching is done at the front and back, the sides being closed in naturally, no stretching being done, for the stretching would cause the head lining to "cup." Care should also be taken where striped goods are used that they are stretched evenly, otherwise irregularity of the stripes will be caused.

Upper Quarters of a Limousine

The upper quarters of a limousine also comprises the upper back. A pattern is made one-half the size, of the distance from door to door, marking around where the head lining is finished at the back and quarters, around the quarter light and rear light. The material is never wide enough to make this section in one piece, so we do our piecing at the center of the rear light. The neatest method of joining is by sewing a flat seam, pressing out the seam flat and sewing on either side from the face. The open space between streamers should be closed in with buckram, card board or canvas, over which is placed solidly a layer or two of cotton wadding. In hanging the cloth we baste tack temporarily, working from the center, tacking smoothly at the finish.

The stretching should be done the up and down way of the goods, allowing the closing in around the quarter lights and rear light to fall in naturally. Any stretching done across the goods at these points will cause the corners to lose the shape of the body.



INTERIOR PACKARD LIMOUSINE.
Packard Motor Car Co., Detroit.



INTERIOR MARMON "34."
Nordyke & Marmon Co., Indianapolis

The pillar trimming should always be padded, but the padding should be cut sufficiently far in to allow for the cord and welt finish or other finish that may be used.

Making Patterns, Cutting Cloth and Materials

In small shops there is seldom considered any system whatever, which often causes much inconvenience and waste of goods. A well-trained trimmer should endeavor to use a system which is as adaptable to a small shop as to a large one in relation to execution and economy in material.

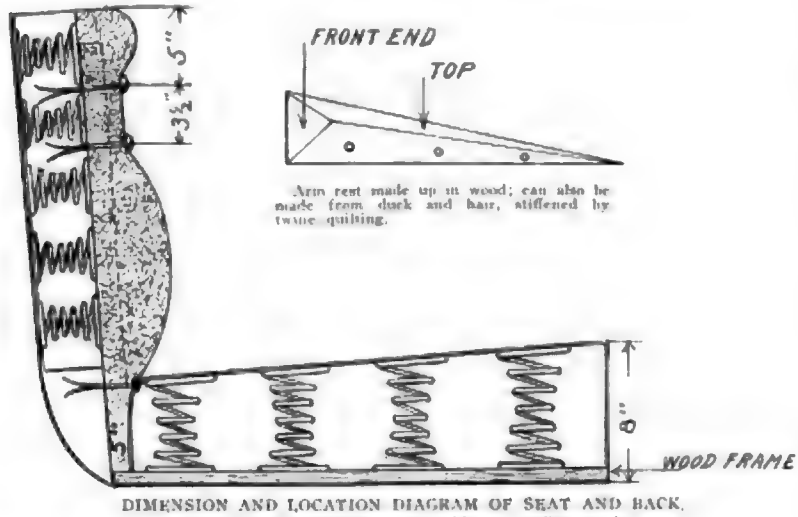
The job should be measured and the amount of goods required ordered with the idea that no material should be left over as waste. It is often the case in small shops that an insufficient amount of goods is ordered for a single job. Now if an order for an insufficient amount of goods is placed and more is required to finish the job the same goods may not be found in stock, con-

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sequently the trimmer proves his inefficiency and puts his employer in an embarrassing position.

Patterns should be made for each individual part of the trimming. Each individual part of the trimming being measured thereby allows the ordering of enough goods and no more. The cutting of material is an economical proposition and the goods for the job should be cut completely at one time.

All the patterns should be laid on the cloth and placed in such a position as to reduce waste. This not only saves time, but is the most economical method. The trimmer should keep at all times a record of the job and the amount of material used, and this record will be useful for duplicate orders. The operating should be done at one time and not as a particular section is being made. This also saves time, not only in large shops, but in small ones as well.



Arm rest made up in wood; can also be made from duck and hair, stiffened by twine quilting.

DIMENSION AND LOCATION DIAGRAM OF SEAT AND BACK.
May be used for either diamond tufting or negligee work.

Trimming Operations Classified

Automobile trimming may be divided into the following branches or operations.

Cutting Room.
- Creating the design.
- Making the patterns.
- Laying out the foundation patterns.
- Laying out the fullness patterns.
- Cutting of the materials.
- Getting out rough stuff as foundations for doors, quarter pads or other parts that require pasting and drying.

Operating Room.
- All sewing that is to be done.

Bench Work.
- Cushion making.
- Back making.
- Quarter making.
- Auxiliary seat trimming.
- Hassock making.
- Curtain making.
- Carpet making.
- Lace making.
- Robe rail and door check making.
- Welt making.

Body Trimming.
- Trimming above the belt line.
- Back and quarter hanging.
- Door trimming.
- Cowl trimming.
- Finishing, such as lacing off, hanging curtains, robe rails, door checks, pull-to handles and other detachable or removable parts.

Separately trained workmen can be used to work the above system successfully, permitting the specializing of operators for each particular branch of trimming.

Many of the above operations may also be sub-divided where the production is sufficiently large to warrant a sub-division. By this method, together with the proper supervision and distribution of materials and work, costs can be maintained at a minimum.

Rug Making

Rug making in well-regulated shops is not handled in the body trimming shop. Patterns are made, a sample rug is gotten ready and fitted in the job to prove the pattern. Then if the pattern proves correct the amount of carpet is cut to fill the order and the binding and operating is done in the operating room.

Making carpet for custom work should be done in this manner. The pattern is fitted to the job, carpet cut according to pattern and fitted in the job to prove its fit.

For limousine work the carpet should always be lined. The reasons for lining are, first to stiffen the carpet, secondly to keep road dirt from penetrating the back of the carpet.

Very often the lining is pasted solidly; sometimes the carpet is laid on the lining and sewed around before binding; sometimes there is a piece of cotton used as a padding.

The carpet is bound with the well-known round binding, but frequently in high-class work we create a French binding, which is done by sewing a line on top of the binding at either edge, thus making a flat binding and adding strength to the work. Where the French binding is used it is necessary to cut the pile of the carpet where the binding is done, thus allowing a flat finish.

On the cheaper grades of work in factory outputs a binding machine is used. On custom work the binding is of the same material as the trimming used. There is also a regular manufactured binding of worsted goods the same color as that of the goods in which the job is trimmed. Also where worsted lace is used the carpet may be bound, turning the face over by hand or used the pile of the carpet where the binding takes place must be cut down.

Binding with flat lace is done in this manner: Sew the bottom of the flange to the carpet first, all around where it is to be bound, turning the lace over by hand or basting, and sew close to the edge by machine. This also creates a flat binding and is extremely neat.

The same system is followed in the making of carpet rocker covers. They may be cut in numbers and be ready to be placed in the job while at the trimmer's bench. In placing the rocker covers in the job, where radius or shape varies, wetting the carpet on the back and using paste in assembly is necessary.

Upholstered Arm Rests

Shapes and sizes of arm rests vary and are made adaptable to the job for which they are intended. Arm rests are seldom used in touring cars or cars of a like character. In limousine work there has been a tendency to reduce the size in order that the utmost room may be given to the riders. A simple method is to use a block of wood made to the shape of drawing, which is screwed on at the proper place, over which the quarter trimming is drawn, producing a pleasing effect.

Door Checks

Door checks are made with the use of footman loops and harness leather, covered in the same manner as the robe rails, but are made flat instead of round, usually one and one-half inches wide. This is intended for custom work. Various methods are used for factory outputs.

Covering Robe Rails

A robe rail is attached to the rear of the front seat partition, both on touring cars and limousines. It is intended for the carrying of blankets or coats or any other articles that may be desired for immediate use.

Robe rails are made in various ways. A simple rail permitting of rapid work and yet neat in appearance is made in this manner: A piece of harness leather one and one-half inches in width is wetted and cat-stitched together; a piece of wire in the center, which is intended both to straighten and shape the robe rail, is inserted; footman loops are used, over which the harness leather is securely fastened and the leather is then rounded to shape. This foundation is then covered with the cloth or leather that is used for the trimming of the job and is closed in with cat-stitching. Then, again, robe rail material is furnished by upholstering importers and jobbers to match the laces.

(To be continued)

News in the Trade

MOTOR CAR NEWS OF DETROIT

From Our Regular Correspondent

A Rumor Denied

E. S. Hare, vice-president of the Packard Motor Car Co., emphatically denies the report which gained circulation during the New York Automobile Show, that a combination is about to be completed of the Packard, Pierce-Arrow, and White Motor interests, and that the head of the combination will be a former official of the Ford Motor Co., who recently resigned.

New Car Coming?

F. H. Berger, former chief engineer of the Oakland Motor Car Co. and of the Abbott Co., is reported to be designing a new car. He has opened an office in the Hodges Bldg.

Pneumatic Tires for Deep Sand

A. C. Fruehauf, president of the Fruehauf Trailer Co., who has returned from Jacksonville, Fla., says that because of the deep sand roads it will be necessary to equip trucks and trailers used by the logging operators with pneumatic tires.

Denby Trucks for Norway

Victor E. Lindzen, Denby distributor at Christiania, Norway, is visiting the Denby Motor Truck Co. and arranging for immediate shipment of 50 additional trucks of various capacities. Mr. Lindzen reports that trucks in Norway are still operating with gas balloons, but a supply of gasoline from the United States is looked for early in March. Performances of Denby trucks, which are used by all of the Government departments of Norway, has been economical with this unusual fuel. Mr. Lindzen believes the truck business in his country this year will be far in excess of any other time.

Demand for Trucks World Wide

G. W. Werden, manager of the Denby Motor Truck Co. export department in New York, was a visitor at the automobile show. "Demand for trucks is world-wide now, owing to the scarcity of ships to deliver orders during the last year of the war," said Mr. Werden. "This is working well for American manufacturers who are first in the market. Recent Denby shipments include Norway, Denmark, Siam, Honolulu, Manila, China, Japan and the Straits Settlements."

Federal Motors Finance Corporation

There is being organized and incorporated the Federal Motors Finance Corporation. This organization will have $5,000,000 capital. Announcement of the officers of the finance corporation and of the complete plant will be made about March 15th. The corporation will give credit to purchasers of passenger cars, trucks and tractors. Prominent Detroit bankers, attorneys and automobile men are interested.

Hudson to Spend a Million

Directors of the Hudson Motor Car Company have authorized the expenditures of $1,000,000 for new machinery and manufacturing facilities. The large plant built for the manufacture of shells has been turned over to the new Essex car branch. In the new plant 20,000 Essex cars, valued at $24,000,000, will be turned out this year. A similar number of Hudson cars, valued at $32,000,000, will be produced in the main plant.

Reported Acason Expansion

While H. W. Acason, president, will not verify the fact, it is understood the Acason Motor Truck Co. has extensive plans for expansion under way, and will be in a new home on the west side of Detroit by August 1st. In a test of six trucks between Paris and Lille, the Franco Canadiene Auto Co., distributor for Acason trucks, reports that the Acason was the only truck to complete the test by reaching its destination. The report to the Acason company is that the roads were in an indescribable condition.

Briscoe Back to Business

Recovering of the Briscoe Motor Corporation from war work to full normal capacity in the manufacture of automobiles has caused general surprise. This company entered into war work with a zest, and converted its automobile plant into a munitions factory in record time and has recovered also in record time with an output now up to normal capacity and a demand which is taking every car turned out.

The 1920 Detroit Show

Consideration of the question of holding the 1920 Detroit auto show in March will be given at the meeting in April, the success of the late show having determined the matter apparently. More than 90,000 people attended the show and the volume of sales was unprecedented.

Willys-Overland Fours

Reports of members of the manufacturing industry dealing with the Willys-Overland Company state that buying is being done for 100,000 of the new Willys-Overland Fours. It is reported the price of this car will be higher than that of the Ford, and lower than the Dodge Brothers' price.

Trailer Prices Stabilized

H. C. Fruehauf, general manager of the Fruehauf Trailer Company, Detroit, announces that present prices are guaranteed against reduction up to September 1, 1919.

Pronovost Wheel Co.

It is reported the Pronovost Wheel Company, Detroit, organized several years ago, intends locating its plant at St. Clair, Mich.

War Equipment for Road Work

Under Section 7 of the Post Office appropriation bill recently passed by Congress the Secretary of War is authorized in his discretion to transfer to the Secretary of Agriculture all available war material, equipment and supplies not needed for the purposes of the War Department, but suitable for use in the improvement of highways.

The Secretary of Agriculture is, in turn, authorized to distribute the same among the highway departments of the several States to be used in roads constructed in whole or in part by Federal aid, such distribution to be made upon a value basis of distribution the same as provided by the Federal Aid Act, approved July 11, 1916, provided that the Secretary may reserve not to exceed 10 per centum of such material, equipment and supplies for use in construction of forest roads or other roads constructed under his direct supervision.

In the confusion incident to the closing days of Congress, no great publicity was given this clause, and it is suggested that everybody interested in the manufacture and sale of automobiles, trucks and wagons would appreciate this information. The good roads question is bound up most intimately with the future of the motor vehicle. Every little bit helps.

Lacquers

The Du Pont Chemical Works, Equitable Building, New York City, has just issued a new pamphlet that will be of interest to manufacturers of builders' trunk and fancy hardware lighting fixtures, silver and gold novelties, also articles made from wood, celluloid and glass that require a water and air-proof coating. It describes a line of lacquers in three grades, suitable for practically all purposes for which lacquers are used.

J. L. Dann has disposed of his interests in the Campbell & Dann Mfg. Co., Tullahoma, Tenn. We understand that Mr. Dann has made no definite plans for the future, but it is hoped he will continue to be identified with the vehicle industry, in which he has hosts of friends and well wishers.

Firestone's New Advertising Manager

News of the appointment of Justin R. Weddell as advertising manager of the Firestone Tire and Rubber Company, Akron, Ohio, will be received with interest in advertising circles. Mr. Weddell assumed his new duties February 1st. He comes from the Corday & Gross Company, Cleveland, where he has been sales manager.



JUSTIN R. WEDDELL
Advertising Manager of the Firestone Tire and Rubber Co., Akron, Ohio

Mr. Weddell's wide acquaintance with national advertisers dates from his entry into the business over ten years ago in one of the large advertising agencies in Chicago. After serving an apprenticeship in that field he entered the organization of the Barnes-Crosby Engraving Company, Chicago, where he handled the work of the prominent advertising agencies of that city, and became familiar with the mechanical part of advertising.

His record led to his appointment a year later as branch manager of the important Cleveland office of the company. While serving in that capacity he developed the service side of the business by adding to his staff trained artists and copy men, and in a little while had built up a reputation for unusually complete advertising and selling counsel. This led to his establishing a business of his own, the Weddell-Schmidt Company, Cleveland, which enlarged still further his circle of clients and acquaintances.

As an outcome of this development, Mr. Weddell and a large part of his organization were taken over by the Corday & Gross Company, in what amounted virtually to an amalgamation of the two concerns. Here his abilities as an organizer and developer of new business were given full play. He was shortly appointed sales manager, which post he has held for the last three years. This connection with a company of national scope has brought him into close and intimate touch with many of the leading general advertisers of the country.

Mr. Weddell is a graduate of New Mexico State College and Denison University. He is a member of many Cleveland organizations and is well known in social and business circles. He will make his home in Akron.

82 Gold Stars in Goodyear Flag

The eighty-second gold star has been added to the big service flag of the Goodyear Tire & Rubber Company, Akron, Ohio. Although four months have now passed since the signing of the armistice, each week ushers into the Goodyear office the name of a former employe who gave his life for his country. This high number of gold stars in the Goodyear service flag is accounted for in the unusually large number of men entering the ranks, 6,500 men having enlisted in their country's service from this one company. To date more than 2,000 of these have returned and resumed their former occupations with the Goodyear company.

Lowry Top and Body Company

The Lowry Top and Body Co., manufacturer of automobile tops and bodies, both light and heavy, has moved from Thirty-third and Walnut Streets, Philadelphia, to its new factory at Gaul and Adams Streets, in the Kensington district. The company's new quarters allow 70,000 square feet for manufacturing purposes. Painting, trimming and mill departments are on the first floor, and the body-building department proper on the second.

Deming-Dibble Color Co.

The opening of the new factory of the Deming-Dibble Color Co. in Detroit, with complete equipment for the exclusive manufacture of fine colors, color varnishes and undercoatings, was an event of interest to all users of these materials.

The active management of this company is in the hands of men of experience and ability, and by confining their efforts exclusively to the manufacture of painting materials used in the automobile industry they hope to be in a position to be of real service on this highly important and rather difficult feature of your production.

H. V. Deming, president and sales manager, is well known to the trade as manager of the Deming Color Co., Toledo, and was formerly for many years a successful salesman of fine colors to the railroad and automobile trades.

Fred. T. Dibble, vice-president and factory manager, is one of the very few expert manufacturers of fine colors in the country. His experience in the painting end of the carriage and automobile industry covers a period of forty years, during all of which time he has been in close touch with the advancement made in the art. His broad experience as practical painter and manufacturer has been of great assistance to the leading automobile manufacturers in devising systems and adjusting materials to meet special requirements and conditions of production.

For the past seven years Mr. Dibble has been factory manager and technical expert for the Ditzler Color Co. Mr. Dibble will be responsible for the quality and uniformity of the Deming-Dibble product, and he is at the service of the trade in an advisory capacity.

R. A. Pulfer will be active in the capacity of treasurer with the new company.

In soliciting your business The Deming-Dibble Color Co. believes it is in a position to serve you to your advantage. The company has the ability and disposition to produce the materials necessary for first-class work. The color samples will be ready in the near future.



PANORAMIC VIEW OF THE LANG BODY CO'S PLANT, CLEVELAND, OHIO, DURING THE WAR
Note that all the cars are camouflaged. This company is now back to regular business, producing bodies of distinction for the trade.

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Detroit Automotive Show

The Detroit Automotive Show was held from March 1st to 8th. The exhibitors included, of different makes (not individual items), passenger cars, 45; commercial cars, 53; tractors, 3; airplane, 1; accessories, 25. The value of the exhibits was considerably more than a million dollars, shown on 80,000 feet of floor space.

With passenger cars, motor trucks, tractors, airplanes and the various accessories for the allied industries on display, the Detroit show assumed the true proportions of an automotive exhibit and was the first big exposition in America to do so.

The Board of Directors of the Detroit Auto Dealers' Association agreed unanimously when it was decided to hold a show this year that Detroit should have something in the way of motor car exhibits that would set a standard for years to come and to attain this end no expense was spared.

This was the eighteenth annual motor car exhibition held in Detroit, but for the last six years the dealers have been handicapped to a great extent by the lack of a suitable building in which to stage the event.

When the motor car industry was young and there were but few models to be shown it was not a difficult task to find a building which would meet the requirements of the show management, but today it is necessary to have space enough to display some 350 various types of cars as well as a vast amount of room for the exhibition of accessories.

In order to present the show this year it was necessary to secure the co-operation of four hundred motor car owners and get their consent to remove their cars from the Crosstown Garage building for a period of two weeks so that the show might have a home which would be in keeping with the prominence of Detroit as the center of the motor industry.

That this end was accomplished without a particle of difficulty proves conclusively that motor car owners are interested in the annual automobile show and they realize what an important part the show plays in Detroit's civic life.

Lancaster Motor Show

Lancaster, Pa., which is one of the most enterprising of Pennsylvania's interior cities, staged an excellent motor show from March 1st to 15th. The first week was devoted to passenger cars, the second to trucks.

The show was made possible through the public spirit of the Rowe Motor Mfg. Co., one of Lancaster's largest industrial concerns, who placed a large building at the disposal of the dealers of the city. This building, just completed, was erected to accommodate the growing business of the Rowe company, and will shortly be occupied by some of the manufacturing departments.

The show was visited by several thousand persons, many of whom took advantage of the opportunity to inspect the Rowe plant. Every afternoon and evening the open spaces in the vicinity were crowded with the parked cars of visitors, who came from all sections of the county.



Two Views of the Lancaster Motor Show, held in a newly erected building belonging to the Rowe Motor Mfg. Co. The show was successful in every way.

Philadelphia Automobile Show

The Philadelphia Automobile Show attracted fifty-six exhibitors from among the most prominent car builders, but some of them exhibited as many as four different styles, most of them last year's models; there were also forty-one accessory exhibitors. On some of the bodies changes could be seen, especially on some of the custom bodies offered by leading dealers.

The Locomobile, the Packard and Pierce-Arrow, as usual, exhibited beautifully finished work, but the Dodge and Simplex, the Mercer and National, Velie and Scripps-Booth, Cole and Liberty, Kissel and Briscoe, Overland and Willys-Knight also exhibited bodies above the average, both in design and finish. The Liberty cars made a good impression.

The Nash perfected valve-in-head stripped chassis was always surrounded by visitors. The Doris cars have always retined styles. The Ford, as usual, exhibited the four styles -- the runabout, the touring car, the coupé and the sedan. Chevrolet showed two closed cars with demountable pillars and glasses to drop.

The Marmon is one of the most attractive cars and claimed to be 1,100 pounds lighter than other cars of the same size. Franklin makes the same claim.

A. Geissel & Sons, Philadelphia, tell their prospective buyers, "Ask the man who uses a Geissel patent converter." A car on exhibition was mounted with one of their latest converters, one side shown without paint and the other side painted black. There are over 1,000 Geissel converters in use in Philadelphia.

Among the cars on exhibition, all had rear round corners except two, which had square corners, and the most notable was the Biddle car, of the Biddle Motor Car Company, Philadelphia, with body built by Sowney Brothers, Philadelphia.

A similar style was first built, with flat side surfaces, very little turn-under, and rear square corners, by Brewster & Company, Long Island City, New York, and exhibited at the Salon Show, New York City, in 1918. This car was described in the March, 1918, VEHICLE MONTHLY, with four illustrations, showing all the details of construction and interior finish. Brewster & Company stated at the time of publication that this car weighs one-third less than any car of similar capacity they had ever built.

The Biddle car nevertheless has been improved from the original design, the combination of belt rail molding, cowl and sedan

(Continued on page 48)

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OUR CINCINNATI LETTER

The machinery at Luth Carriage Co. is humming with activity.

* * *

The Phoenix Carriage Co. are very busy and working full-shift in all departments

* * *

Haberer & Co., who specialize in commercial bodies, are working hard to supply their trade.

* * *

The Brown Carriage Co. are having a big demand for their goods and are working full time as usual.

* * *

E. V. Overman, of the Standard Parts Co., is now conveniently located at 423 Union Central Building, Cincinnati.

* * *

Perrin P. Hunter was out of the city for several days recently. He reports business prospects as being very bright.

* * *

The G. A. Schacht Motor Truck Co. are enjoying a splendid business and are receiving numerous orders for their popular trucks.

* * *

Otto Heinrichsdorf, of the Brewer-Titchener Corporation, came in from the road for a few days and called on the trade in Cincinnati.

* * *

Harry Jay, manager of the Edward F. Alf Co., who makes Detroit his headquarters, was a welcome visitor in Cincinnati this month.

* * *

The Hickory Carriage Co. are now removing to their new plant in Lawrenceburg, Ind., and expect to be in shape by April 15th for a large production.

* * *

A. T. Nutter, of the A. T. Nutter Gear Wood Co., Seymour, Ind., called on his trade in Cincinnati recently and departed for home with numerous orders.

* * *

John A. Creighton, representing the Truscon Laboratories, Detroit, Mich., is having a very large trade for his product, and his many Cincinnati friends wish him well in his new position.

* * *

L. A. Geserich, St. Louis, Mo., representing The Cotex Company, Newark, N. J., artificial leather manufacturers, was in Cincinnati for several days. Mr. Geserich reports trade as being very good.

* * *

There was a meeting of carriage manufacturers of the country held in Chicago on March 11th. A large delegation from Cincinnati and vicinity attended the gathering. Matters of vital importance to the industry were taken up.

* * *

Word has been received from W. J. R. Alexander, the popular secretary of the Cincinnati Carriage Makers' Club, who is traveling in the interest of Beckwith-Chandler Co. in Latin America, that he just passed Cuba and is now on his way to Chile.

* * *

R. J. Matthews, of the Fernald Mfg. Co., North East, Pa., was a visitor among his trade in Cincinnati during the month. Mr. Matthews is very popular in this section and has many friends. He states that he is enjoying a nice business on Fernald quick shifters

* * *

The Rim Manufacturers' Association was in session at the Hotel Sinton on March 5th. The meeting was the regular quarterly session of this association and twenty-two factories from all over the country were represented. B. F. Van Behren, Evansville, Ind., president of the association, predicts a very good business during the year.

* * *

The many friends of L. D. Lutz, the genial Cincinnati representative of the Eberhard Mfg. Co., Cleveland, Ohio, are glad to see him out again, after a severe spell of illness. Mr. Lutz's son, Nixon, who enlisted in the 130th Field Artillery, Battery E, met with a serious accident in France by walking out of a hatchway and falling twenty feet. His parents are assured that he is doing very nicely and recovering slowly but surely.

Cincinnati Carriage Makers' Club

The March meeting and dinner, also the annual election of the Cincinnati Carriage Makers' Club, took place on the evening of March 10th, at the Business Men's Club, with an attendance of fifty-one members and four guests.

On account of the absence of the president, the chair was occupied by the second vice-president, Harry McBride, who called the meeting to order at 7 o'clock.

There were eleven applications for membership at this meeting, and the following gentlemen were elected and their names added to the roster of the club: C. J. Boon, of the American Steel and Wire Co., Cincinnati; Fred. D. Buob, of Buob & Scheu, Cincinnati; Louis J. Buob, of Buob & Scheu, Cincinnati; Wm. Breckenridge, of McKinnon Dash Co., Troy, Ohio; D. L. Carpenter, of D. L. Carpenter & Co., Cincinnati; Clem H. Davis, of Scherer & Co., Detroit, Mich.; Ed. F. Fischer, of Buob & Scheu, Cincinnati; S. W. Mitchell, of the Mitchell Wheel Co., Miamisburg, Ohio; Chas. W. Paver, of C. L. Doughty Advertising Agency, Cincinnati; John J. Schiff, Jr., of the Ed. F. Alf Co., Cincinnati, Ohio; Ferd J. Suesz, of the Sayers & Scovill Co., Cincinnati.

Major Baldwin's Address

The speaker of the evening was Major Bert L. Baldwin, of the United States Engineers, who gave some of his experiences in France. The major surely did relate some startling happenings "over there." He had his hearers spellbound and spoke for two hours and five minutes, and when he was finished he stated that he could talk at greater length, and then he would be unable to relate his complete experiences in France.

The major stated in part that he "was in France for one and a half years with the formation of the Officers' Reserve Corps, which included physicians, chemists, engineers, scientists, etc. All were given commissions for the Officers' Reserve Corps. He was with the Third British Army and was under shell-fire numerous times. He had charge of the light railways and roads, which included the small narrow gauge 24-inch railways. These were run to the front line trenches to take on supplies and bring back the dead and wounded.

The major stated that the Germans did not stop at anything and stripped factories, cotton mills, dwellings and agricultural works completely of tools, drawings, machinery, etc. The roads and the country generally in that part of France are reduced to powder, so that farming in the near future is impossible on account of the terrific shell-fire."

The major concluded his remarks and impressed all that we should be one hundred per cent. American and show our boys who are now returning and those who will return later that in America every man, woman and child is one hundred per cent. true American.

Election of Officers

The annual election, which took place at this meeting, afforded a great deal of amusement, and the usual friendly rivalry existed. The following were the successful candidates for the Board of Governors, elected for two years: George Huston, Theo. Luth, E. E. Hess, W. F. O'Brien. These gentlemen assured the club they will give their best efforts for a greater and better Carriage Makers' Club, and thanked the members for their support.

This was one of the most enjoyable gatherings that the Carriage Makers' Club has given in recent years, and the menu, under the direction of Chairman P. P. Hunter, was highly praised. The orchestra lent their share towards making the March meeting a pleasant memory in the history of the Carriage Maker's Club.

Americanization Work at Firestone Plant

Several meetings in the interest of promoting Americanization were held recently at the plant of the Firestone Co., at Akron, Ohio. An assembly in the boot and shoe department was addressed by the superintendent of schools and the director of community centers.

The same speakers addressed a gathering of foremen and managers at the club house, and later, together with men who had been successful in the instruction of the foreign born, they spoke before the employes at the rim plant.

On all these occasions the advantages of knowing the English language and becoming

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acquainted with American modes of life were forcefully portrayed, and foreign-born employes were strongly urged to enroll in the daily classes being held in the club house.

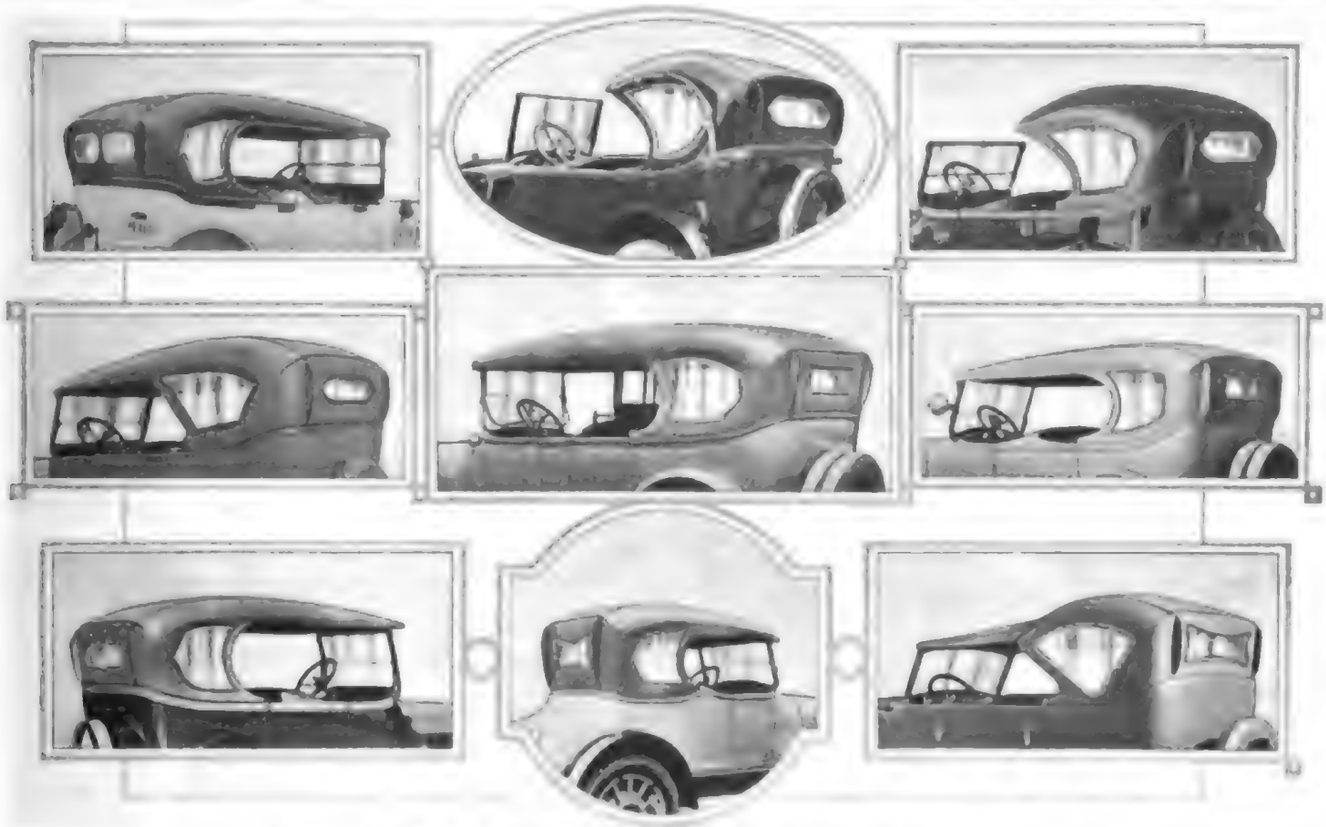
On the following Sunday afternoon moving pictures of an educational nature were shown and there were offered musical numbers by some of the Roumanian girls clad in their native costume.

which the trucks will be run on April 3d.

Starting on the morning of the third, three trains will be made and run to Fort Valley, Barnesville and Monticello, Ga., respectively, stopping at intermediate highway points to load and unload traffic. The freight to be transported will be carried on this demonstration trip to each of the above named points free of charge. One of the trains will

Philadelphia Vehicle Builders' Banquet

The twenty-fourth annual banquet of the Carriage and Wagon Builders' Association of Philadelphia was held on Tuesday evening, March 25th, at the Hotel Hanover, Twelfth and Arch Streets, Philadelphia. The entertainment committee, of which August



VICTORIA SOLID FRAME TOPS COVERED WITH "CRAFTSMAN FABRIKOID"

The design and method of constructing these tops originated in Los Angeles, Cal. The Henry B. Day Co. of that city were first to introduce "Craftsman Fabrikoid" as a covering material for them, creating a vogue that has captured the entire Pacific Coast and which is now being copied in many sections. The leathery grains and rich Moorish colors of the Fabrikoid are lost in the ruggedness, but to their beauty the development of this type of top is mostly due. The "Craftsman Fabrikoid" gives permanent service and actually improves as its colors mellow and deepen with age. A top covered with it gives a car a striking elegance and individuality that compels admiration.

Motor Transport Demonstration

The Motor Transport Demonstration, at Macon, Ga., April 3d, is to be the first general show of its kind held in the South, and is the result of a determination on the part of Macon Chamber of Commerce to encourage the greater employment of highway transport for meeting the needs of commercial, agricultural, live stock and fruit industries surrounding that city, which is one of the most enterprising in the State.

The traffic department of Macon Chamber of Commerce recognized the need for additional means of transportation, for it was discovered that the rural interests were only about 40 per cent. served with transportation facilities suitable for every requirement of commerce, agriculturists, fruit growers and stock raisers.

It is the plan to assemble all trucks entered on the evening of April 2d for a parade through the streets of Macon. This parade will be headed by the Governor of Georgia, Mayor of Macon and of the several cities to traverse the largest peach orchard in the world, and the others through the most prosperous agricultural sections in the South.

Cincinnati Business Conditions

The automobile trade in Cincinnati is improving and the dealers in this line of business are very optimistic regarding the future. The truck manufacturers in this vicinity are looking forward for a large business during the spring and summer.

Business in Cincinnati with the carriage industry is very good indeed, and orders are being received in rather large proportions. All indications point to a very satisfactory spring trade.

Prices on the raw materials are declining somewhat, but in no great degree. This condition is not unexpected because our Uncle Sam is not placing orders now as he did during the war.

Geissel, Jr., is chairman, had charge of the arrangements.

Several hundred persons, including the members, their families and friends, attended the function, which was in every way equal to any of the many annual dinners given by this association. After the banquet, dancing occupied the attention by the younger set until an early hour of the morning.

The regular monthly meeting of the association occurred on Friday evening, March 21st, at which officers were elected for the ensuing year. This meeting registered the completion of William T. Dunbar's presidency of the organization, under whose administration there has been a forward movement that has been evident to all. He has made an efficient and faithful officer always "on the job," and doing his utmost for the interests of every member of the association.

If you would be wealthy, think of saving as well as getting.—Buy War Savings Stamps.

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Philadelphia Automobile Show

(Continued from page 45)

front is a great improvement, and the sedan front is decidedly original and a far-sighted departure from all other sedan fronts.

The back corner curve of the body, that is, the square pillar, with a slight curve below the belt rail molding, is also a real improvement.

This car is called the "Salon Sedan," has four doors, two on each side, all opening toward the front; two individual seats for front, both stationary, and one seat for two passengers in rear. Trimmed in dark gray cord. The inside surfaces of doors are cane, of the small pattern, and entire top boards are headed 14½ inches apart. Entire interior of top is finely finished, stained and varnished.

Philadelphia Truck Show

During the second week of the show fifty-two makes of trucks were exhibited, together with trailers, tractors and truck-forming units. Not on any previous occasion has there been assembled such a variety of makes, capacities and designs in commercial vehicles. The new Rowe truck, specially designed for using giant pneumatic tires and employing a high-speed engine, attracted much attention. This company, as well as some others, displayed a full line, demonstrating that there is a truck exactly suited to every hauling purpose.

Storing Timber to Prevent Decay

(Continued from page 9)

as for pile foundations in the open. The sheds should be tightly roofed and the siding should not be run down below the bottom of the foundation sills. Free air circulation should be allowed from all sides beneath the inclosure. Only thoroughly dry stock should be stored in close piles under cover.

Should fungous outbreaks occur in storage sheds not constructed to meet sanitary needs the infected foundation timbers should all be torn out and replaced with wood soaked in an antiseptic solution or by concrete or brick.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line each insertion (8 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

FACTORY EXECUTIVE.—Able, efficient man as general foreman or superintendent on closed or open auto bodies, with practical training open for engagement. At present handling a 150 a week closed body production. Age, 35. Don't answer unless you have something worth while. Address "610," care "THE VEHICLE MONTHLY," Philadelphia.

BODY DRAFTSMAN.—Have permanent position open for a first-class man familiar with development of new work on black boards, full size shop layouts and production methods. Excellent opportunity for the right man. Address "5," care "THE VEHICLE MONTHLY," Philadelphia.

BODY MAKER AND CONTRACTOR, with long experience on high-grade closed bodies (doing drafting if necessary) would like position with good reliable firm. Have had experience on both custom and large orders. Can furnish some help. Eastern States preferred. Address "25," care "THE VEHICLE MONTHLY," Philadelphia.

FOREMAN BLACKSMITH. An experienced and capable man desires position as foreman in automobile factory doing high-class work. Can furnish references as to character and ability. Address "30," care "THE VEHICLE MONTHLY," Philadelphia.

FOR SALE.—Auto, carriage and wagon repair business, also truck body building department. MRS. C. J. WELDON, Rockford, Ill.

GENERAL FOREMAN OR SUPERINTENDENT. High-grade man experienced in the manufacture of open and closed auto bodies, is open for engagement. Active and progressive executive, good organizer and first-class mechanic. At present and several for man handling 50 on closed bodies a day. Address "16," care "THE VEHICLE MONTHLY," Philadelphia.

SAND BLAST FOR SALE.—Complete Pangborn equipment practically new and in first-class working order. Inspection invited. Demonstration cheerfully given. THE HOLBROOK CO., 67th St. and West End Ave., New York City.

SALESMAN for Eastern territory capable of handling a high grade line of varnishes, colors and other specialties to the automobile painters. State age, experience and salary expected. Address "20," care "THE VEHICLE MONTHLY," Philadelphia.

WANTED.—A first-class trimmer on pleasure cars and commercial bodies and general repair work. A. S. DRUMWRIGHT, Norfolk, Va.

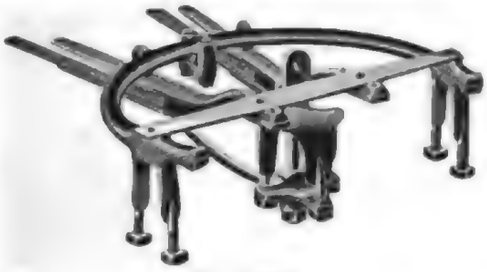
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ESTABLISHED 1791

VARNISHES, ENAMELS and JAPANS

Harland's Imported English Varnishes have been used by the best Carriage Builders for over a hundred years. They are used today by the best Automobile Body Builders all over the world. A large proportion of the high class bodies, both custom and factory built, are finished with HARLAND'S IMPORTED BODY VARNISH.

Buffalo, N.Y. Merton, Eng. Toronto, Can.



No. 1933
For spread or parallel reach

Wilcox Fine Finished Forged
Carriage Hardware and Gear Irons

Write us for Catalogue

THE D. WILCOX MFG. CO.
MECHANICSBURG - - - CUMBERLAND CO., PA.

NACTO Upholstery Cleaner
NACTO Slip Cover Wash
NACTO Slip Cover Compound

NACTO
THE THOROUGH CLEANSERS
PRODUCTS

NACTO Soap
NACTO Tar Remover
CARBON-NOT The Carbon Remover

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HIGH GRADE WORK AND PROMPT SERVICE

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FOUNDED 1880
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LAFFITTE WELDING PLATES

Weld
Iron and Steel
at a remarkable low heat. They will produce a perfect homogeneous weld in at leasta third of the usual time and no waste

If you want a welding compound that you can absolutely depend upon under all circumstances — try Laffitte Welding Plates
SAMPLES FREE
on request

The Phillips-Laffitte Company
Pennsylvania Building Philadelphia, Pa.
Dealers everywhere handle *"LAFFITTE"*



A 1½-Ton Truck Worthy of the Name It Bears

The 1½-ton Gramm-Bernstein is built as you would expect B. A. Gramm to build it.

But even had the name been strange—its outstanding superiorities and unusual value would have been recognized at once.

As one positive evidence of this value, take the one important item of springs.

These Gramm-Bernstein springs are longer than you would expect in a 1½-ton truck. They have more leaves. In addition, they are made of Vanadium alloy steel.

Less costly springs might do as well But B. A. Gramm will not endanger the remarkably fine, clean reputation his trucks have been 18 years building.

$1895 1½-Ton Chassis with Driver's Seat
F. O. B. Lima, Ohio

$1975 1½-Ton Chassis with all-weather cab, doors, curtains, and windshield

$2115 1½-Ton Truck, complete as illustrated, with flare-board express body, which is convertible into a slatted express body and a covered, slatted express body.

The same thing applies to the rear axle—the load-carrier. It would stand up under a 2-ton truck. Its bearing sizes are from one to two sizes larger than those specified for many other axles of the same stated capacity.

But Mr. Gramm puts this axle into a vehicle he rates at 1½ tons, to insure his buyers a long-lived, thoroughly reliable truck.

Some engineers doubtless would consider his transmission gears entirely adequate for a 2½-ton truck. Mr. Gramm knows they are exactly right for a 1½-ton truck.

The propeller shaft is two-piece, with three universal joints instead of two. This does away with the "whip" of the ordinary one-piece shaft.

Misalignment and undue strain of the frame are prevented by the extra size of this member. It has six sturdy cross members—gusseted for greater strength—and rear corner braces, in addition to the usual corner gussets.

You see now why we call this 1½-ton truck an unusual value, deserving of far more than ordinary consideration.

It is unusual in its units. It is even more unusual in the practical experience and engineering skill evident in its design and construction.

It is the first 1½-ton quick delivery truck we know of which combines, at an attractive price, all these elements—which are necessary for successful truck operation.

The Gramm-Bernstein line includes all required capacities from 1½-ton to 5-tons—all chainless drive.

We ask buyers and business men to look into this line, and to examine carefully the Gramm-Bernstein records for economical operation and remarkably long life.

THE GRAMM-BERNSTEIN MOTOR TRUCK COMPANY
GRAMM BERNSTEIN
MANUFACTURERS OF HIGH GRADE CHAINLESS MOTOR TRUCKS
Lima Ohio, U.S.A.

Builders of the first standardized Liberty (U. S. A.) Truck

About Concealed Hinges



Style No. 802

WE HAVE manufactured for years a Concealed Hinge with drop forged steel hook, and a drawn brass non-rusting case. One of our designs is shown in the accompanying illustration, and we desire to inform the trade that all Concealed Hinges we make are fully protected under U. S. Patents owned by us. We will protect all users of our Automobile Door Concealed Hinges, or for that matter on any other goods which we may manufacture and offer to the trade.

The English & Mersick Company
New Haven, Conn.

Porter's BOLT CLIPPERS

THE BEST



"EASY" Nos. 1 and 2
Parts always to be had

"NEW EASY" Nos. 0, 1, 2, 3
Porter's name on all genuine tools

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Campbell & Dann Manufacturing Company

Solicits your Spring orders for

SHAFTS AND POLES

Ironed or Unironed

Gears, Buggy and Auto Bows, Seat and Body Bendings

MIXED CAR LOADS A SPECIALTY

TULLAHOMA - TENNESSEE

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MODERN METHODS
IN YOUR
UPHOLSTERY DEPARTMENT

THE PURPOSE being to produce better work, in less time, at lower cost.

It can be accomplished by making your fillers of

Barnhardt Cotton Batts

They eliminate the bother of stuffing, enabling the upholsterer to quickly secure the flat effects in cushions and backs now so much in vogue.

Barnhardt Batts are made from *pure* cotton—the finest grown—the long fibre variety which gives *long* service without matting.

Barnhardt Batts are furnished in rolls. This means economy to the user, for the exact amount for each job may be cut as required, hence no left-overs, no waste.

Write for samples of Barnhardt Batts and suggestions for improving upholstery without increasing its cost.

BARNHARDT MANUFACTURING COMPANY
CHARLOTTE - - NORTH CAROLINA

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FROM A "DOLLARS AND CENTS" STANDPOINT IT WILL PAY EVERY WAGON BUILDER TO POST HIMSELF ON THE TRACTOR-SEMI-TRAILER METHOD OF HAULING, AS THERE WILL BE A BIG DEMAND FOR SEMI-TRAILERS THIS YEAR, AND THE WAGON MANUFACTURERS ARE THE LOGICAL PEOPLE TO BUILD THESE TRAILERS.



This 5-Ton Pierce-Arrow Truck Hauls From 10 to 12 Tons on a Semi-Trailer

THE Martin Rocking Fifth Wheel Company can assist the wagon trade in securing a large part of this profitable business. We can furnish everything in semi-trailer equipment, from 1 to 10 tons capacity, except the body itself. Our line includes Rocking Fifth Wheels, Floating Bearing Axles, Springs, Wheels, Tires, and all other parts for semi-trailer use.

Our new catalog describes fully the advantages of the semi-trailer method of hauling and shows the wagon builder how he can profitably take advantage of the new business that is rapidly developing. Discounts to the trade are exceptionally liberal.

MARTIN ROCKING FIFTH WHEEL COMPANY

Pioneers of the semi-trailer method of hauling

SPRINGFIELD MASSACHUSETTS

Trailmobile

Trade-Mark Reg. U. S. Patent Office

The Motorless Motor Truck

Thousands in Use

SIZES
1,250 lbs.
1,500 lbs.
2,000 lbs.
3,000 lbs.
4,000 lbs.
7,000 lbs.
10,000 lbs.
Also semi-trailers

Bodies for every business

Contractors to the U. S. Government.

Demand, Good Profit, Small Service Cost

THERE are three big reasons why it will pay some live dealer well to handle the Trailmobile in your territory.

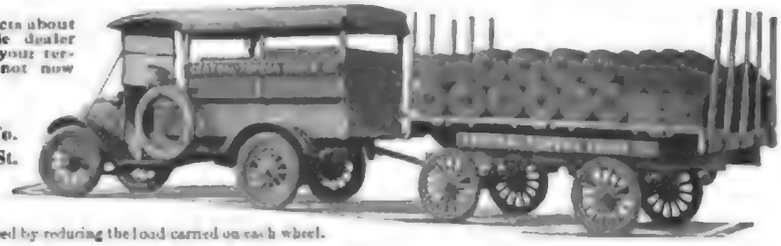
The demand is there. Trail hauling is the biggest idea in road transportation right now. The army proved its possibilities. Thousands of Trailmobiles in actual use have produced astounding results—and are greatly increasing the demand. National advertising on a big scale is doing its work.

It is an easy, pleasant line to handle. There is no trouble after the sale—practically no service expense. The Trailmobile is probably less expensive to handle than any line you carry.

The margin on the Trailmobile is the same as the most desired cars and trucks—and expense is so low it is practically all profit.

Write for the facts about the Trailmobile dealer proposition in your territory if it is not now sold there.

The Trailmobile Co.
574 E. Fifth St.
Cincinnati, O.



Good roads are preserved by reducing the load carried on each wheel.

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WHY DO YOU STRUGGLE ALONG WITH OBSOLETE RIM BENDING METHODS?

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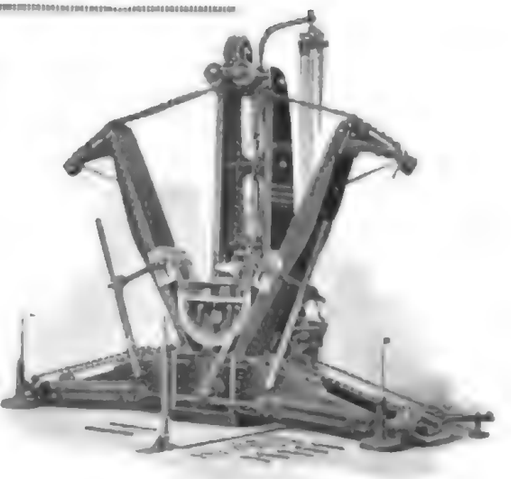
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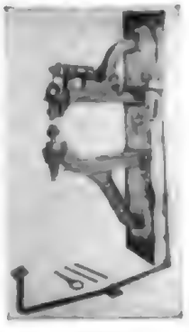
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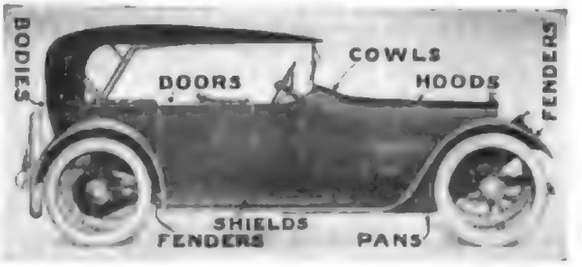
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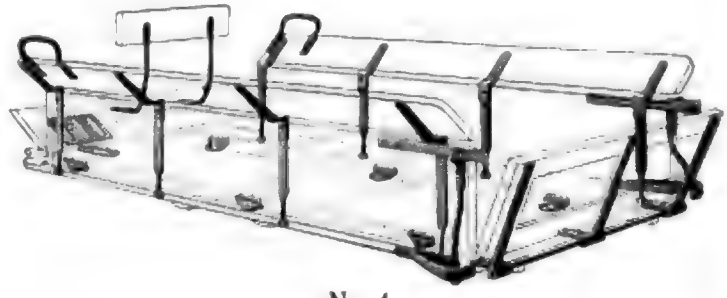
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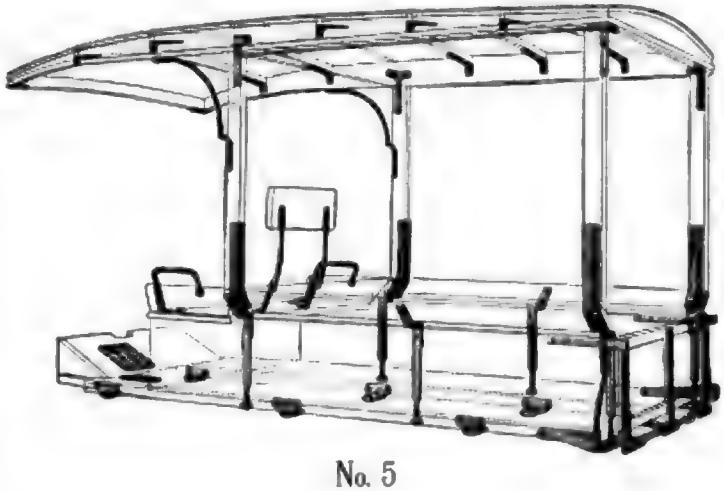
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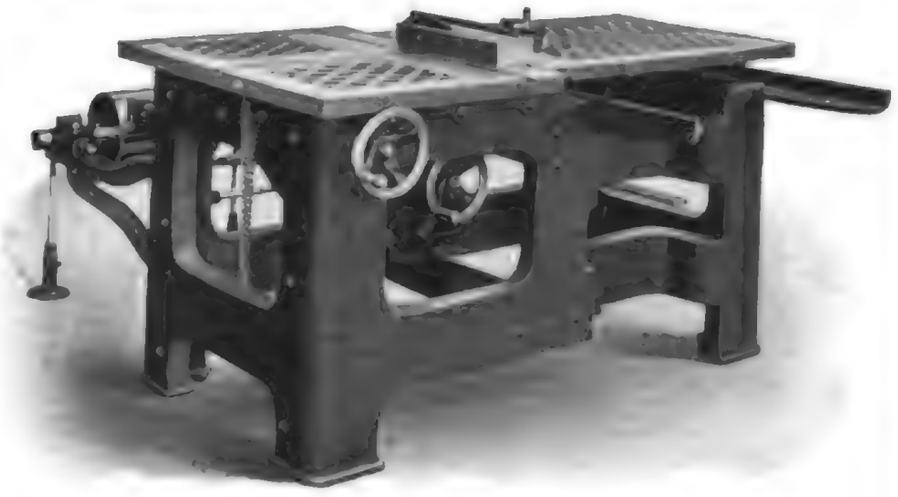
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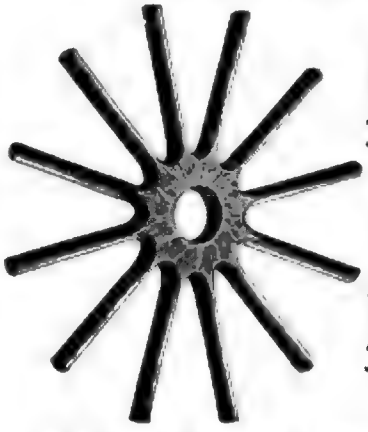
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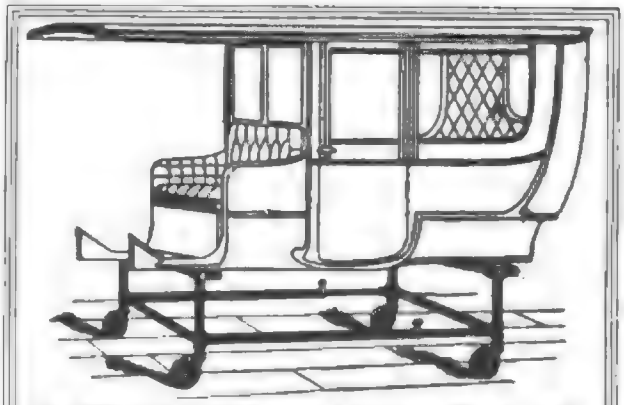
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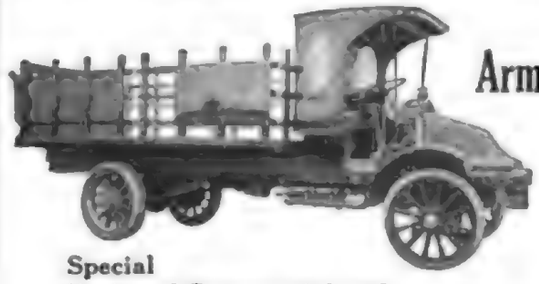
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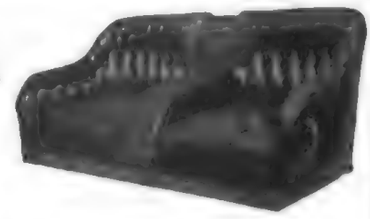
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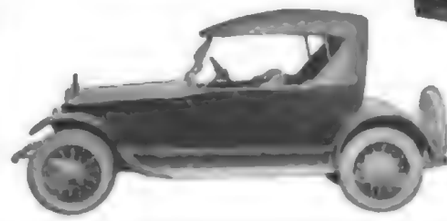
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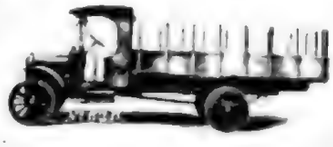
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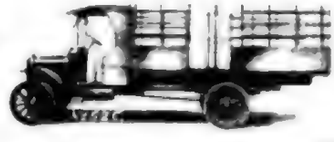
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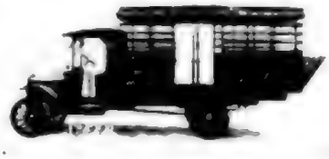
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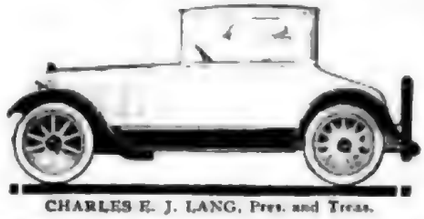
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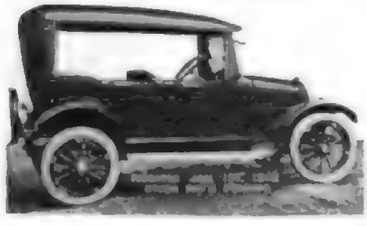
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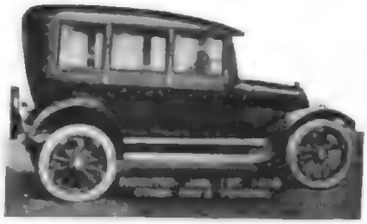


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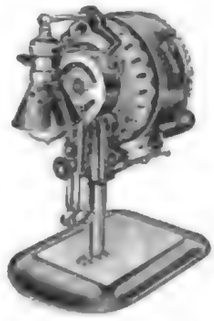
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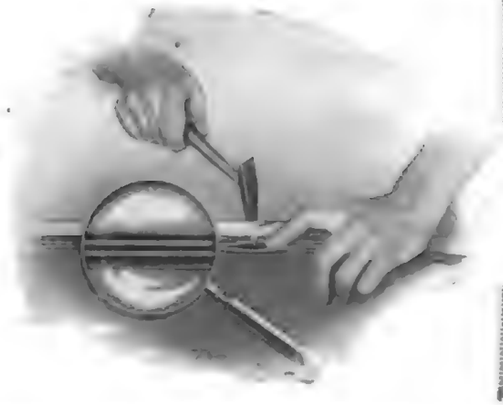
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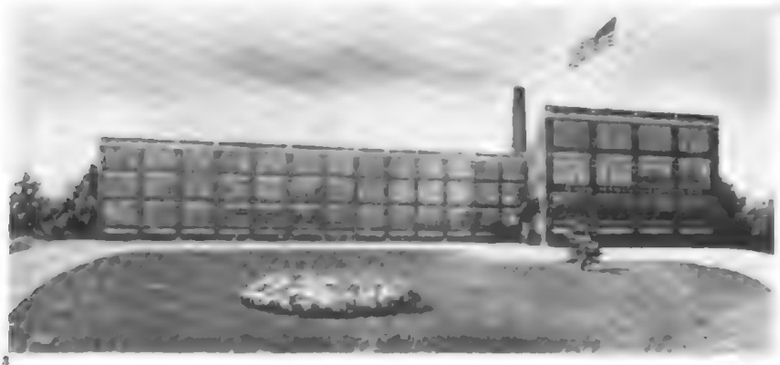
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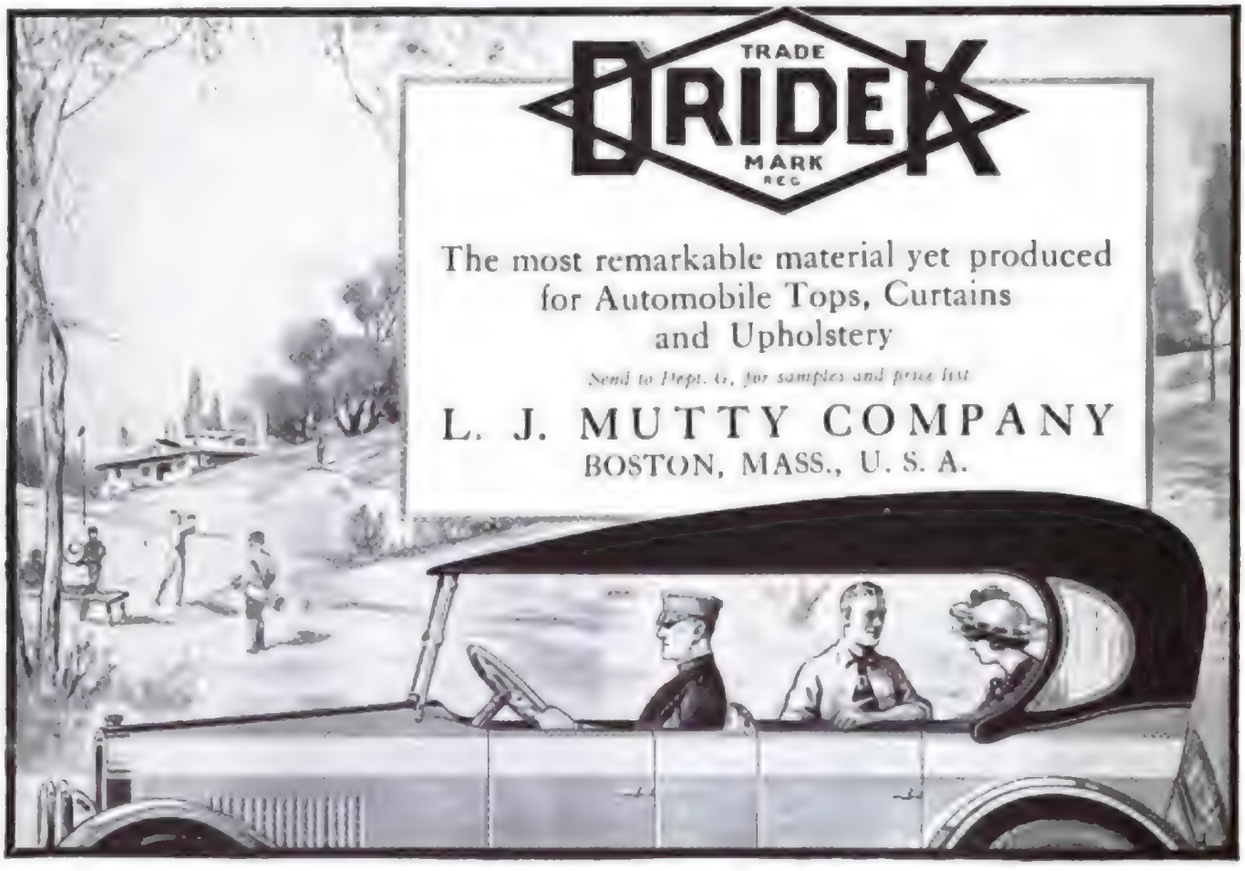
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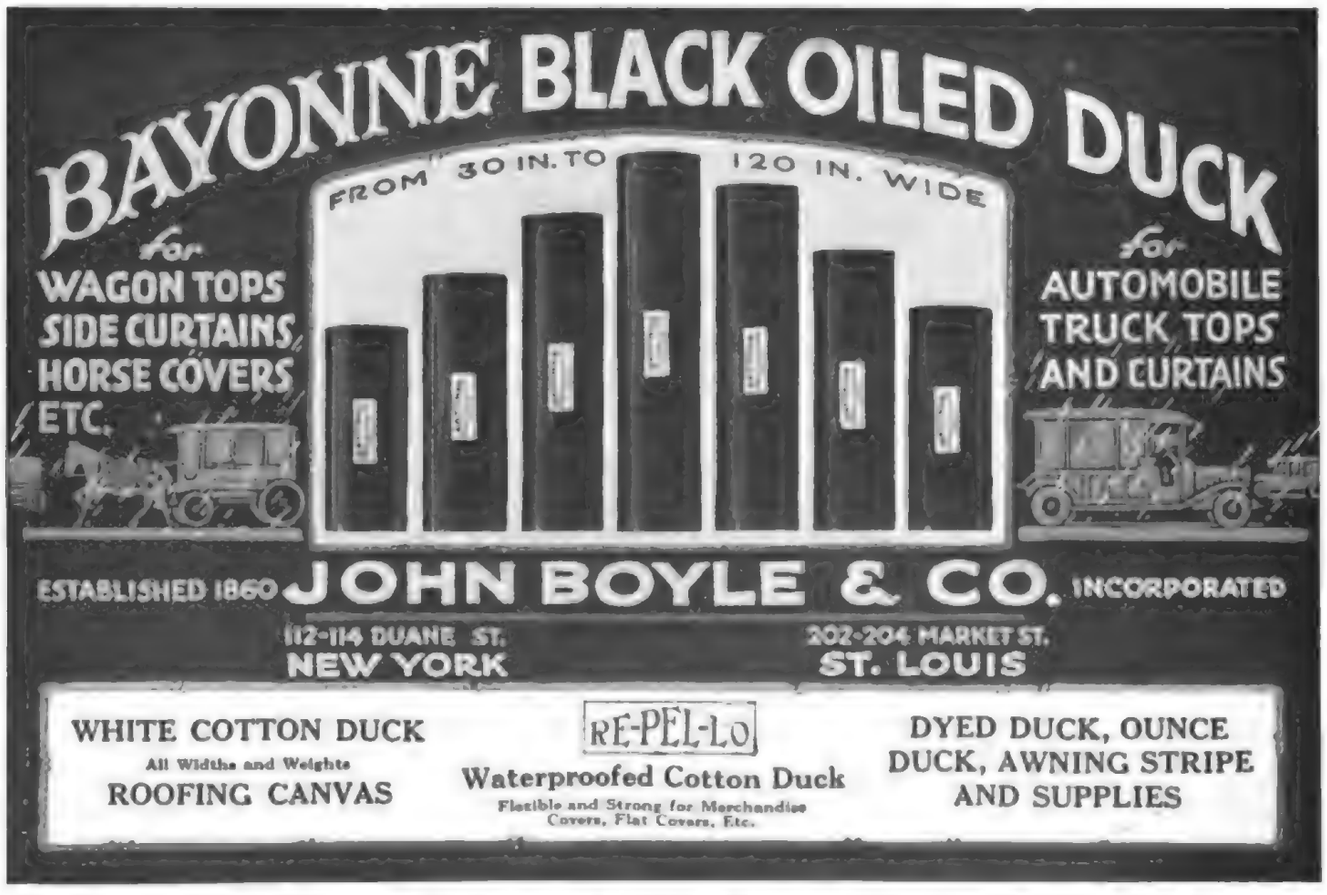
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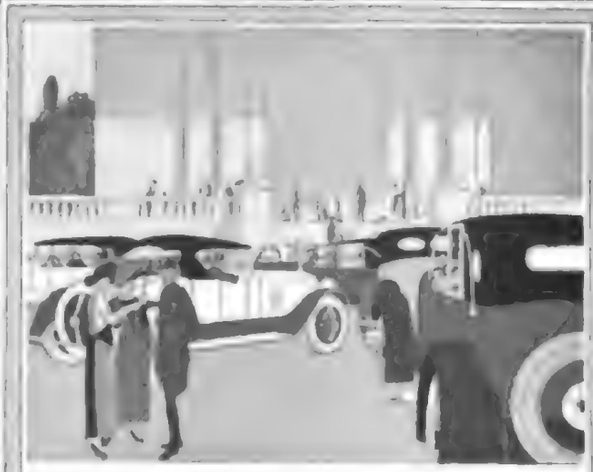
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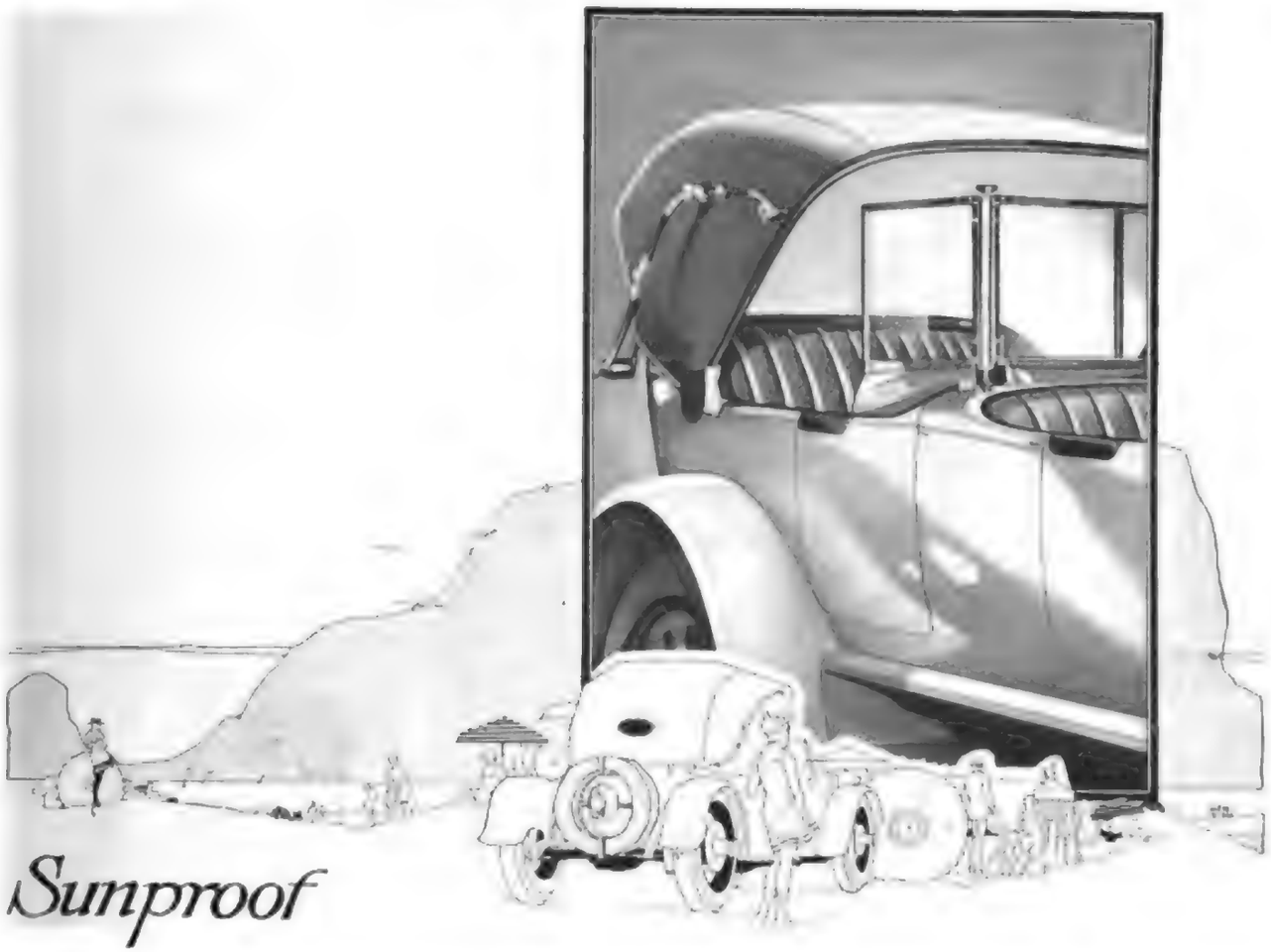
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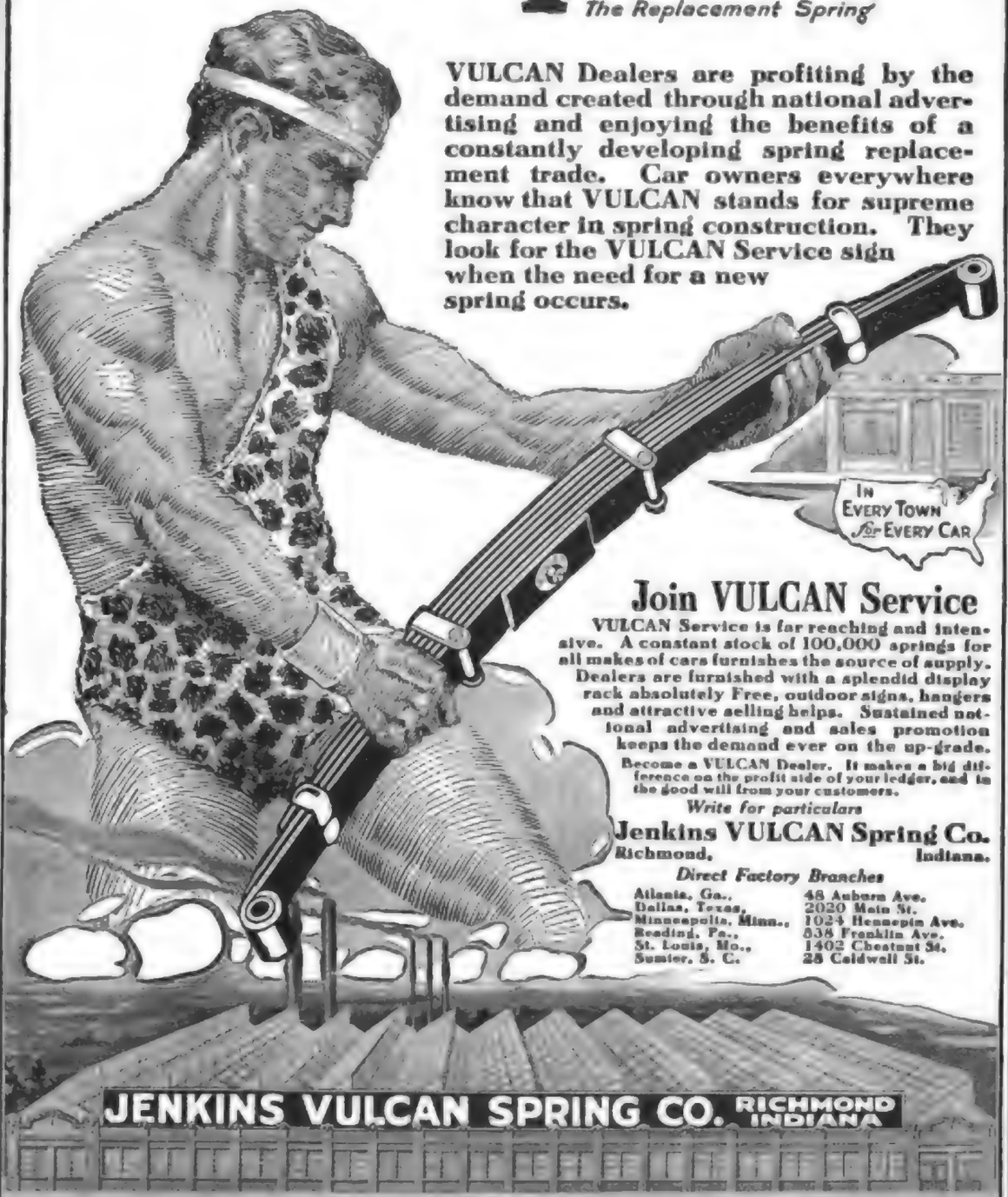
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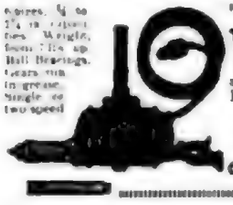


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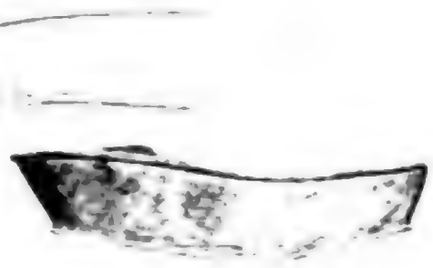
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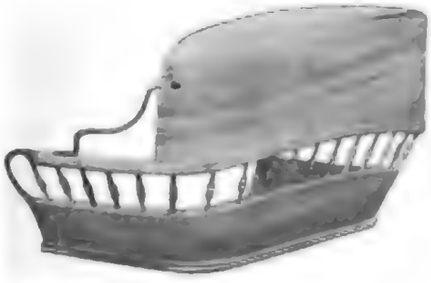
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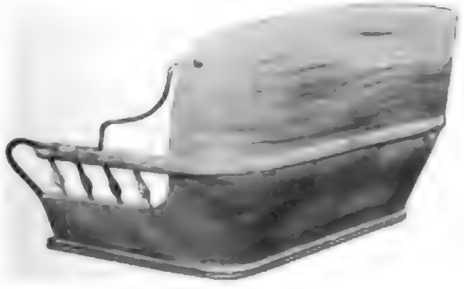
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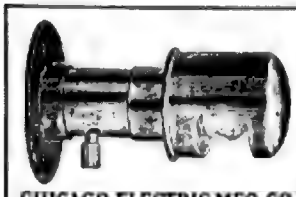
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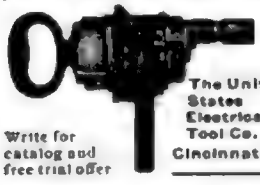
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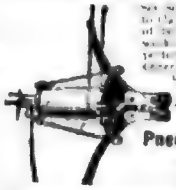
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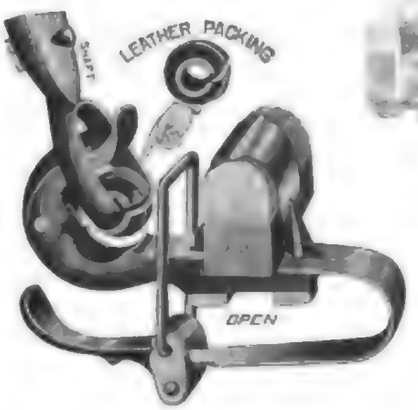
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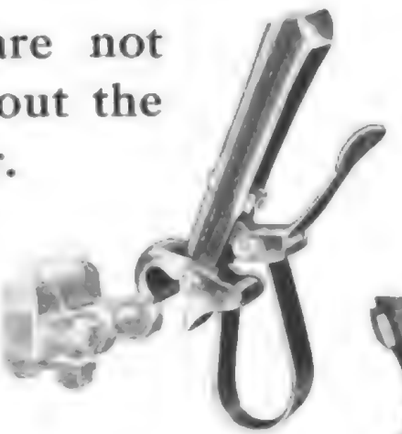
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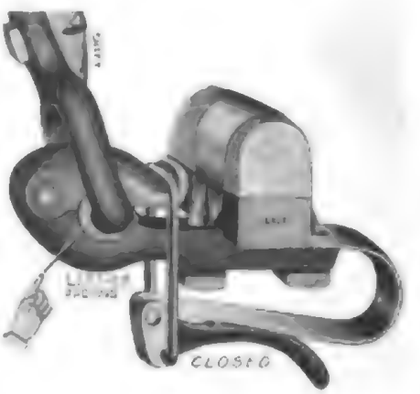
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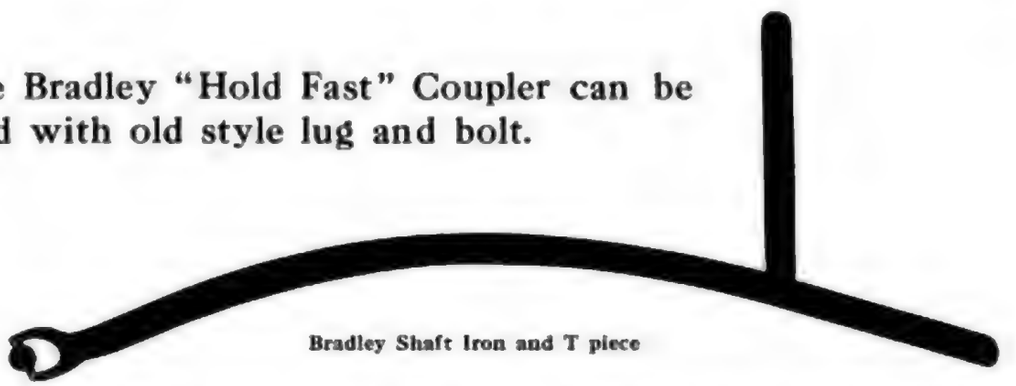




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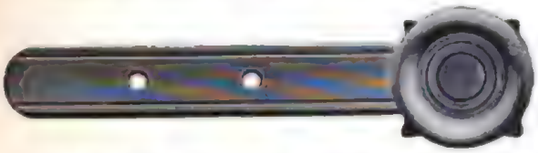
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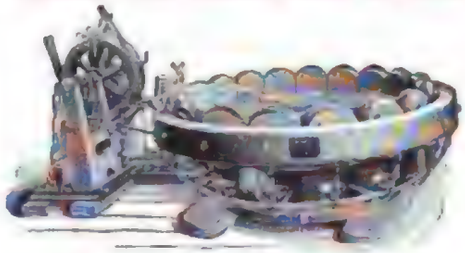
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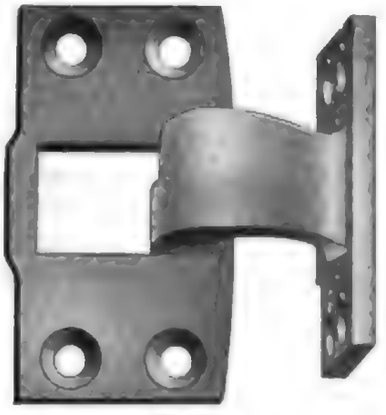

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THE WEST TIRE SETTER COMPANY, ROCHESTER, NEW YORK

THE MONARCH CARRIAGE GOODS Co

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Perfected for Passenger
and
Commercial Car Application



No. 39



No. 41

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Parsons Manufacturing Co.
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FOR VEHICLES OF
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SHELDON AXLE &
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Largest Axle and Spring Works
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WILKES-BARRE, PA. - U. S. A.

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"The Name of International Fame"

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FOR VEHICLES OF
EVERY DESCRIPTION

SHELDON AXLE &
SPRING COMPANY

Largest Axle and Spring Works
in the World

WILKES-BARRE, PA. - U. S. A.

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OUR advertising manager wrote a note to Mr. Overman asking what he desired to say in the vehicle journals concerning the peace-time line up of our organization.

And Mr. Overman Replied:

This is in response to yours of the 13th.

To facilitate our changing from military conditions to a civil or peace basis, our company has appointed me General Manager of our plants at Connersville, Ind., and Wheeling, W. Va. I will also, as heretofore, be in charge of sales of vehicle springs and axles. My headquarters will be Suite 423-424 Union Central Bldg., 4th and Vine Sts., Cincinnati, Ohio.

This promotion is a source of gratification to me for many reasons. I have been connected with the vehicle industry for more than thirty years. Nearly every man engaged in that line is personally known to me and I believe most of them are my intimate friends.

When I came to Cleveland, about one and a half years since, the war was at its worst. Steel and all materials necessary to my lines were scarce and difficult to procure at any price. All my energy was concentrated on making our company realize the importance of securing these materials, even regardless of cost. It is gratifying to be able to say that they certainly did all it was possible to do.

Now, friend Braden, you have our publicity matters in charge. I want the trade to know my address and I desire you to impress them with the fact that we are enlarging and improving our equipment for the manufacture of vehicle products. I promise them good, up-to-date, prompt service in every respect.

Mr. Charles Heflinger, with headquarters at Norfolk, Va., will continue to look after our interests in the South. His long experience as a vehicle builder equips him with an intimate knowledge of all vehicle problems.

Mr. Earl M. Hunker will assist me in manufacture, and sales in the North. From boyhood he has been continuously employed in various capacities in our Canton plant and is familiar with all features of the vehicle lines.

With these facts before you, I hope you will assist me to acquaint the trade fully of these changes.

Yours truly,

E. V. OVERMAN,
General Manager.

And the advertising manager believes Mr. Overman has stated the case rather better than he could have done and prints the above accordingly.

THE STANDARD PARTS COMPANY

Executive Offices:
CLEVELAND, OHIO

Vehicle Division Offices:
Union Central Bldg., Cincinnati, Ohio

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THE VEHICLE MONTHLY

PUBLISHED FOR 54 YEARS AS

THE MAGAZINE FOR VEHICLE MANUFACTURERS

Published Monthly by
WARE BROS. COMPANY, PUBLISHERS AND PROPRIETORS.
1010 ARCH STREET, PHILADELPHIA, PA.

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REPRESENTATIVES

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FOREIGN SUBSCRIPTIONS.—Australia, Africa, India and all parts of Europe and other countries included in the Postal Union, $3.00. The increase in price is to pay the extra expense of mailing. Agent for New Zealand, Richard Hill, Matlock House, Devonport, Auckland, New Zealand. Price, 12 shillings 6 pence, postpaid.

Remittances should be made by post office money order, bank check or draft, express money order, or registered letter.

Advertising rates will be furnished on application. Copy for advertisements should reach us not later than the tenth of the month to insure insertion in the following issue. Changes in advertisements should reach us not later than the tenth of each month.

THE VEHICLE MONTHLY is a member of the A. B. C.

Vol. 55, No. 2 **PHILADELPHIA, MAY, 1919** **Subscription Price $2.00 Per Year**

War Department's Surplus Trucks

The Director of Sales of the War Department has made a statement regarding the surplus motor-driven vehicles now in the custody of the department. An outline of this statement is printed below:

Automobiles

"Many rumors have been circulated throughout the country as to the disposition of the surplus motor-driven vehicles now owned by the War Department. The following outline of the proposed method of handling this matter is given by the Director of Sales, War Department:

"1st. The different branches of the Government will be consulted to see whether the surplus in the War Department of automobiles and motor trucks can be used to fill their requirements.

"2d. Various manufacturers of vehicles will then be approached to see if they will take over the vehicles of their own make to market them with their own machines, thus giving the Government fair market price and at the same time disturbing the market conditions as little as possible.

"3d. The net surplus remaining, after the above methods have been followed out, will be disposed of to the public, either through auction or by sealed bids. Full publicity will be given these sales in order that the Government may realize the best results of the sale."

A Foreign Market at Home

While American manufacturers are straining every nerve to build up a foreign trade for their goods, there is a foreign market at our doors which has hardly been touched. No doubt, just because it is so near at hand, it has been ignored, and its possibilities overlooked.

If it is profitable to spend hundreds of thousands of dollars and to send skilled "trade missionaries" to the Old World in order to educate the natives to American ways and American products, why would it not be quite as profitable to teach the thrifty foreigners in America to demand standard American goods and to live in American style? There is but one answer, it would pay, and pay well.

There are in America 15,000,000 foreign born, or, including those of foreign parentage, there are 33,000,000 buyers of American goods. But a large proportion of them are not buying more than they have to, because they prefer the familiar wares from their own countries. Many of them do not know about American goods or how to use them. Another reason that they are not buying more is that they have the habit of hoarding their savings to send abroad, denying themselves every comfort while in America so that they can live in style later on in the Old World.

It has been stated that $1,500,000,000 are held by foreigners at present, awaiting transmission to Europe as soon as the bars are let down.

Foreigners are making good wages, but have little inclination to spend them. The time is ripe for an educational campaign to encourage them to live in American style, to teach them about American goods, in short to make these thrifty and prosperous people good customers for our products.

Rural Motor Express as a Public Utility

The first purpose of the rural motor express is to establish communication between producer and consumer at the lowest possible fair charge to the latter. With but 250,000 miles of railway in the United States as against 2,500,000 miles of highway, the importance of such a service to the public at large cannot be underestimated and, in effect, its economic relation to cost of living is so close as to justify its classification as a public utility on a part with other services which seek to provide us with the necessaries of life.

Past experience has shown that at some point in the operation of such units, the factor of regulation must be taken into consideration, as otherwise we are confronted by one of two conditions: (1) Either one group is so much more powerful than the others that it assimilates them and becomes a monopoly, or (2) undue competition results in an uneconomic condition that forces all parties to it into bankruptcy.

Rural motor express operation has tended to move toward the latter conclusion. Numerous incidents can be cited which illus-

(Continued on page 9)

PUBLISHERS' STATEMENT

Statement of the ownership, management, etc., of "The Vehicle Monthly," published monthly at Philadelphia, Pa., as required by the Act of Congress of August 24, 1912.

Name of	Post office Address
Publisher, Ware Bros. Company,	1010 Arch Street, Philadelphia, Pa.
Editors, Chas. A. Heergeist and A. P. Cardwell,	1010 Arch Street, Philadelphia, Pa.
Managing Editors, Chas. A. Heergeist and A. P. Cardwell,	1010 Arch Street, Philadelphia, Pa.
Business Managers, R. C. Ware and A. M. Ware,	1010 Arch Street, Philadelphia, Pa.

Owner, Ware Bros. Company. (If a corporation, give name and address of stockholders holding 1 per cent. or more of total amount of stock.)

W. F. Ware, Lansdowne, Pa. R. C. Ware, Wayne, Pa.
A. M. Ware, Wayne, Pa. M. Isabel Ware, Wayne, Pa.

Known bondholders, mortgagees, and other security holders, holding 1 per cent. or more of total amount of bonds, mortgages, or other securities: None.

WARE BROS. COMPANY.
(Signed) A. M. WARE.
Treasurer.

Sworn to and subscribed before me this 22d day of March, 1919. My commission expires January 21, 1923.
HARRY C. BLASE.
Notary Public.

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The New Price Revolution

Extracts from an address by IRVING FISHER, Professor of Political Economy, Yale University. Read before Conference of Governors and Mayors at the White House March 3-5, 1919.

It is interesting to observe that many manufacturers think that prices must come down, including the price of labor; but they are ready to demonstrate to you that their own prices can not come down, nor can they pay lower wages. Almost everything they buy somehow costs twice as much as before the war, and their labor is twice as dear. They can not pay their labor less if labor is to meet the increased cost of living. Now, as a matter of fact, when we investigate almost any individual one of the so-called high prices for industrial products, we are likely to find that individually it is not high; that is, it is not high relatively to the rest. Our quarrel is with the general level of prices.

Variations in the general price level may be compared to the tides of the sea, while individual prices may be compared to waves. Individual prices may vary from this general level of prices for specific reasons peculiar to individual industries, just as the height and depth of waves vary from the general level established by the tide. The causes controlling the general price level are as distinct from those controlling individual prices as the cause controlling the tides are distinct from those controlling individual waves.

Are Prices Coming Down?

Read What These Men Say

"Let's all stop worrying and get to work."—EDWARD MOTT WOOLLEY, "Collier's," March 22d.

* * *

"Prices will never return to the old pre-war levels. Business men who are holding back, waiting for the old prices, are chasing a rainbow. Business men should face the facts. To talk reverently of 1913-14 prices is to speak a dead language today.

"The buyers of the country, since the armistice, have made an unexampled attack upon prices through their waiting attitude, and yet price recessions have been insignificant.

"The reason is that we are on a new high price level, which will be found a stubborn reality. Business men are going to find out that the clever man is not the man who waits, but the one who finds out the new price facts, and acts accordingly."—PROF. IRVING FISHER, Yale University.

* * *

"Prices are not coming down in America. The manufacturer who is halting upon the theory that the bottom is going to drop out of raw material will find the bottom out of his business before it is out of raw material. The retail merchant who is waiting until he can purchase cheaper goods will have his store closed by the sheriff and no way to get the cheaper goods upon his shelves.

"The man who has denied himself and stinted himself during the period of the war and is now husbanding his resources upon the theory that prices are going to take a tumble may succeed in washing his shirt to shreds before he can buy a much cheaper one."—VICE-PRESIDENT THOMAS R. MARSHALL, "Leslie's," Feb. 22d.

* * *

"Shall problems of readjustment and reconstruction destroy our progress and defeat our resolution? It is inconceivable. All that we need is individual courage and confidence.

"The belief in prosperity is its creation."—FRANK A. VANDERLIP, President National City Bank of New York, in "Manufacturers' Record," Dec. 19, 1918.

* * *

"Procrastination is more than a thief of time, it is the murderer of opportunity."—"MANUFACTURERS' RECORD," March 13th.

The General Price Level

The general level of prices is dependent upon the volume and rapidity of turn-over of the circulating medium in relation to the business to be transacted thereby. If the number of dollars circulated by cash and by check doubles, while the number of goods and services exchanged thereby remains constant, prices will about double.

The great price changes in history have come about in just this manner. The "price revolution" of the sixteenth century came upon Europe as a result of the great influx of gold and silver from the mines of the New World. Europe was flooded with new money. More counters were used than before in effecting exchanges and prices became "high." People talked then of temporary "inflation," just as they talk of it now. But it was not temporary; it was a new price level.

A similar increase in price all over the world occurred between 1896 and 1914, following the discovery of the rich gold fields of South Africa, Cripple Creek, and Alaska, the invention of the cyanide process in mining, and the vast extension of the use of bank credit.

Extension of Credits

Circulating credit—that is, bank deposits subject to check and bank notes—is a multiple of the banking reserve behind these deposits and notes; and the essence of this reserve is gold. Our present monetary system is an inverted pyramid, gold being the small base and bank notes and deposits being the large superstructure. The superstructure grows even faster than the base. The deposits are the important elements. They are transferred by check from one individual to another; that is, the circulation of checks is really the circulation of deposits.

Thus any increase in the country's gold supply has a multiplied effect. The possible extent of that effect is dependent upon (1) the amount of gold available, and (2) the gold reserve requirements, determining the volume of credit that can be put into circulation based upon the gold. Over a billion dollars has come into this country from abroad since 1914, and a large amount has disappeared from domestic circulation. The gold from both these sources has found its way into the United States Treasury and into bank reserves. On June 30, 1918, the portion of the gold reserve of the Federal reserve banking system which supported national bank deposits and Federal reserve notes was more than three times as large as the gold reserves under the old national banking system on June 30, 1914—$1,780,000,000, compared to $592,000,000. During the same period credit instruments (demand deposits and notes) increased about twofold—from $6,100,000,000 to $11,700,000,000. This increase of credit instruments is typical of the banking situation for the country as a whole and largely explains the present high level of prices.

The increase of gold has been so great, however, that the base has grown faster than the superstructure, which is contrary to the normal tendency. The ratio of gold to credit has risen from 9.6 per cent. to 15.3 per cent. The legal reserve requirements of the present system are such that for 1918 there is an excess of gold above these requirements of more than $700,000,000. The reserve required by law to support the $11,700,000,000 of credit instruments of 1918 is $1,070,000,000. The

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$700,000,000 of free gold could support an additional superstructure 70 per cent. as large as the existing one, which indicates that for the banking of the country as a whole a potential future expansion of 50 per cent. is a conservative estimate.

European Prices Have Risen More Than Ours

At the present time European goods are not "low priced" (however little the money wages of European labor will buy). Prices in Europe since the war began have risen more than they have in the United States. The price rise has been less the farther from the seat of hostilities. It was least in Aus-

Every business man should carefully study Professor Fisher's article in full. It has been published for distribution by the Division of Public Works and Construction Department, U. S. Department of Labor, Washington.

tralia and New Zealand. It was next least in the United States, Canada and Japan. Then came neutral Europe; then our present allies; and finally Germany and Russia. Gold tends usually to flow from high-priced countries to low-priced countries, so that until "inflated" European prices fall gold is not likely to flow thither. Prices are no more likely to fall there than here, and for the same reasons, which will be explained below.

Increase in Deposit Banking on the Continent

Looking into the still more remote future, there will be in Europe, particularly on the Continent, a vast increase in deposit banking. The need of the Governments there for funds during war times hastened the introduction of deposit banking. Money went out of circulation into bank vaults, and there became the basis for circulating credits. This means a new habit which will lead to a great currency expansion. Far-away countries, like India and China, are also learning to use deposit banking. It is as if a new source of gold supply had been discovered. What has been discovered is a new way of using the gold supply. The world, during the course of the war, has thus started, or has hastened, an equivalent of the price revolution of the sixteenth century.

Go Ahead on the New Price Level

Business men should face the facts. To talk reverently of 1913-14 prices is to speak a dead language today. The buyers of the country, since the armistice, have made an unexampled attack upon prices through their waiting attitude, and yet price recessions have been insignificant. The reason is that we are on a new high-price level, which will be found a stubborn reality. Business men are going to find out that the clever man is not the man who waits, but the one who finds out the new price facts and acts accordingly.

Rural Motor Express

(Continued from page 7)

trate the point and which are anything but special in their application.

War conditions enforced a transfer of large quantities of freight from the railroad to the highway. When normal conditions were restored the motor express routes could not compete with the railroads and their business was either taken entirely away from them, or greatly diminished.

In Colorado, a motor truck route was established between two good-sized cities. A good rate was fixed and the company profited. Its operations attracted other investors, a rate war ensued, both were forced to withdraw and the community suffered.

In other cases, men of little capital were attracted to the business by the success of others and through inaccurate knowledge of operating and overhead costs, fixed rates at too low a point.

Finally unscrupulous operators of no financial responsibility crept in or honest operators hired unscrupulous drivers with the net result that costly shipments were damaged in transit, leaving the shipper without financial recourse and consequently setting up a resistance to future operations by efficient, responsible organizations.

In view of these conditions and going back to the first consideration of the function of rural motor express as a public utility, it would seem that the subject is sufficiently important to the public to justify the enactment of legislation which would:

1. Place the matter of rate making in the hands of a public utility commission which would base those rates upon a knowledge of local conditions, making them equitable to shipper and operator alike and making impossible neglect of the interests of the community which should always be considered as of first importance.

2. The enactment of legislation which would seek to protect the shipper from undue loss in transit as he is now protected in the case of railroad traffic.

3. The compilation of educational data which should teach the motor truck operator how to gauge the needs of his territory, how to arrive at his operating costs, and how to give the best service to the public.

Industrial Research and Business

Immense sums of money have been expended during the past two years to increase the available supply of knowledge of manufacturing processes. It is to be regretted that this knowledge was not already available at the beginning of the war.

New industries are generally developed along scientific lines through intensive industrial research; old industries are frequently encumbered with traditional practice and rule-of-thumb methods that discourage the development of improved methods.

Among the striking and costly lessons of the war is the fact that business and industrial development and progress are inseparably linked with industrial research. No product or process is perfect. The stragglers in the glorious procession of American industrial progress are those products and methods which have not been steadily improved.

The Director of the Forest Products Laboratory earnestly desires to make available to the wood-using industries of the nation in the most practical way the facilities for industrial research provided by the United States Forest Service at the Forest Products Laboratory, Madison, Wis. All information secured may be obtained by the industries through personal co-operation, publications, technical notes, and correspondence.

Your Unpaid Dollars

What They Saved America

It is a real American village. It is 20 miles west of the Mississippi River; its population—about 2,600.

It gave its sons to war with an open hand and a glad heart.

Then—

The richest man in the village aged ten years in ten days. His only son lay dead in France.

The village butcher boy—born in Ireland—smiled for the last time in France. He died fighting for America.

The village Beau Brummel won the Croix de Guerre and lost his sight.

One family sent three sons and lost two.

Gas claimed a merry school boy of 19 years.

The realities of this village are the "might-have-beens" of all America.

But, thank God, America as a whole never really felt the hand of war—as England felt it, as France felt it, as our neighbor across the border, Canada, felt it.

And why?

Because your dollars stopped the war. Your dollars made possible those tremendous preparations for a long war which resulted in a short war. Your dollars bought such an array of tanks and trucks, guns and gas, bayonets and bombs, planes and pontoons, shot and shell, that Germany waited a year ahead of schedule.

Half a million American boys were saved.

The dollars that did it are still in your pocket.

For America prepared on Faith. She knew that true Americans held their dollars cheaper than their sons. She knew that American thrift would gladly take the place of American blood.

America now asks you for those unpaid dollars.

Let your heart say *how* thankful you are that half a million American sons were saved.

Subscribe to the

Victory Liberty Loan

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The Truscon Laboratories where Laboratory Quality Finishes are Manufactured

"Laboratory Quality"

And What It Means To Buyers of

WOOD and METAL PRIMERS	GEAR FILLERS
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Laboratory Quality is the Buyers' guarantee. It insures products that embody only the highest possible quality and uniformity. Nothing is left to chance or guess work. Every ingredient and process used is the result of scientific study.

Laboratory Quality is the standard of every product which The Truscon Laboratories offer to vehicle manufacturers and which includes a complete line of finishing materials.

The extensive plant and facilities of The Truscon Laboratories assures *Laboratory Quality* on quantity production. It insures an adequate supply upon which vehicle manufacturers may depend at all times.

Laboratory THE TRUSCON LABORATORIES Quality

The Truscon Laboratories

Manufacturers of
Automobile Colors, Undercoatings, Enamels, Color Varnishes, Baking Japans and Varnish

Detroit - Michigan

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

IV.—GETTING BUSINESS

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

The previous articles on repair shop equipment, layout, and system have set the stage for the operation of a motor car repair shop. These are the means whereby the business can be handled. Aggressive and intelligent methods of *getting* and holding this business are necessary. And this means the unremitting work and thought of some organization head who can interest the car owner in the repair shop; sell him its product, and keep him sold.

A Business Head Necessary

In a repair shop, as in any business, the person in charge should not be tied up with detail, but should be free to think, and plan and work out the methods for getting business; to see, in general, that all parts of the organization are working smoothly, and to apply the personal touch that changes the dissatisfied customer into a satisfied one. And in this the fundamentals of any successful merchandising business are used.

Fundamentals of Getting Business

The fundamentals of getting business may be divided into two groups—those covering the field outside of the repair shop and those in the repair shop, or organization. Both are tied together by the business head.

(*a*) *Outside Fundamentals*—

1. Newspaper advertising.
2. Circular letters.
3. Circular advertisement.
4. Personal calls on prospects.
5. Telephone calls on prospects.
6. Milestone and sign board advertising.
7. Advertising features or stunts.

(*b*) *Shop Fundamentals*—

1. Clean shop.
2. Courteous and expert workmen.
3. Attractive and frequently changed window displays.
4. Handling of nationally advertised supplies and accessories.
5. One-price scale for all, and a cash business basis.

Newspaper Advertising

Local newspaper advertisements are a valuable asset in a "getting business" campaign. But their effectiveness cannot be based upon the amount of space used and the amount of money spent. It is rather the result of appealing copy, frequently changed. The new business should set aside a certain sum of money to be used for advertising purposes; and the well-founded business apportions a definite percentage of its yearly profits to be so used. Advertising is an investment on which definite returns are to be expected.

Fig. 1 shows a good example of repair shop advertising. Here are some of the good features: First, it talks about a definite thing—tire repair—and appeals to all car owners without confusing them with shotgun remarks on chassis repair, painting supplies, accessories, etc. Secondly, it appeals to the pocketbook—and tells how money may be saved. Thirdly, it is brief, easily read and understood, and gets the message across.

Similar advertisements may be run in subsequent issues of the local papers on engine overhaul; chassis repair; electric starter repairs; battery repair; fender repair; top repair; upholstering; washing; painting; gasoline; oil and grease sales; seasonable accessory sales; storage, or any one of the many other kinds of service or merchandise that the repair shop may have to offer.

Often small reading notice type advertisements are effective—and for the same reasons as given above. One such is shown in Fig. 2. This was sent in by a VEHICLE MONTHLY car owner reader who had read the advertisement and been sold by it.

Let us sum up briefly the main points of successful newspaper advertising:

1. Frequent use of small, attractive, direct reading copy.
2. Frequent change of the copy used, to bring a new message to the reader.
3. Occasional use of large space—full and double-page—on important occasions, such as anniversaries, business campaigns, automobile shows, new model announcements, etc.
4. Utilization of small reading notices, and "want column" type advertisements.
5. The use of a business slogan in all advertisements to bind them together—such a slogan as "Parker Service Satisfies," etc.



FIG. 1 A Good Example of Repair Shop Advertising.

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Circular Letters

Circular letters possess an advantage over the newspaper advertisement—namely—the appeal is made directly to the logical prospect. But in preparing and sending out a set of circular letters, the following points are to be noted:

(1) Secure a list of all car owners in your territory and classify them as to—

(*a*) Make of car.
(*b*) Age of car.
(*c*) Type of body.
(*d*) Major accessories needed (starter, spot lights, tire pumps, fire extinguishers, etc.)

These lists may be secured in various ways, but the best way is to build it up name by name, and analyze each, as entered. Card index systems should be used, and various colored tabs should be used to show the different classifications. These cards should constantly be kept up to date; dead names dropped, and new ones entered.

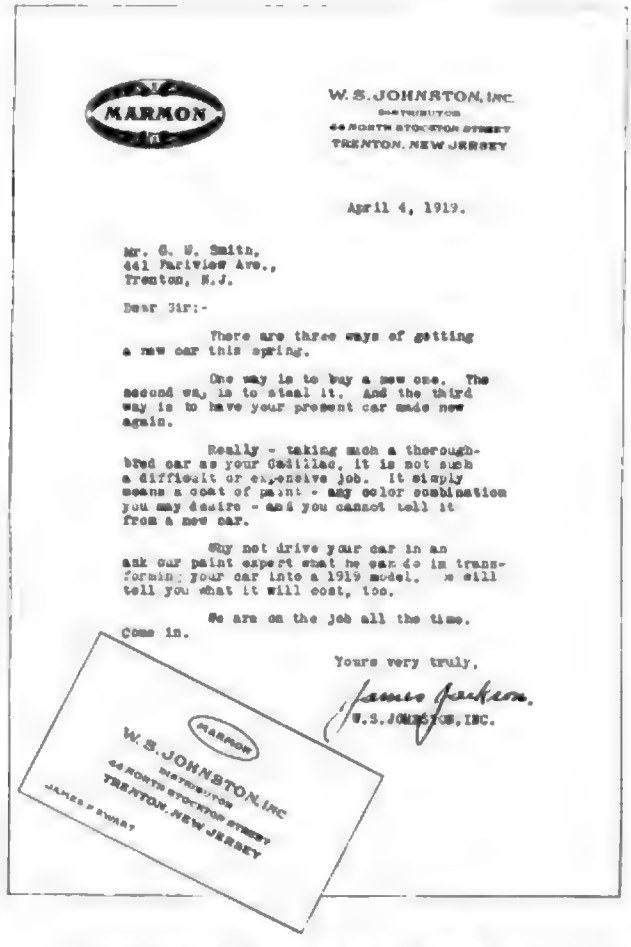
(2) Get neat, attractive stationery—for the appearance of the letter is a reflection on the house that sends it. A typical—and good—example of the stationery now being used by many dealers is shown in Fig. 3. The paper chosen should be a good quality bond, 8 or 8½ x 11 inches, the feature being the reserved and practical method of engraving the firm's name. It will be noted that the same die or type set-up is used for stationery, envelope and business cards.

(3) Prepare a series of seasonable circular letters. The following subjects are suggestive:

1. Engine overhaul letter.
2. Repainting letter.
3. Accessory letter.
4. Upholstering letter.
5. Battery service letter.
6. Vulcanizing letter.
7. Wash and polish letter.
8. Chassis repair letter.
9. Top repair letter.

These letters should be most carefully written—get the prospect's side of the questions and go directly to the point. The letter shown on Fig. 3 is an excellent example. The method of placing the body of the letter on the sheet is to be noted. Circular letters should be provided for all of the parts of the business it is decided to push.

(4) Pick out from the prospect lists those car owners that should be logical prospects for the subjects of the letter in question. For example, the owner of a new car would not be interested in repainting; an electric car owner would not be interested in compression tight piston rings, etc. Hence, if the letters be sent only to the logical prospects, and the prospect lists be carefully compiled, the effectiveness of the circular letter campaign will be at its highest efficiency.


MARMON

W. S. JOHNSTON, INC.
DISTRIBUTOR
44 NORTH STOCKTON STREET
TRENTON, NEW JERSEY

April 4, 1919.

Mr. G. W. Smith,
441 Fairview Ave.,
Trenton, N.J.

Dear Sir:-

There are three ways of getting a new car this spring.

One way is to buy a new one. The second way, is to steal it. And the third way is to have your present car made new again.

Really - taking such a thoroughbred car as your Cadillac, it is not such a difficult or expensive job. It simply means a coat of paint - any color combination you may desire - and you cannot tell it from a new car.

Why not drive your car in and ask our paint expert what he can do in transforming your car into a 1919 model. He will tell you what it will cost, too.

We are on the job all the time. Come in.

Yours very truly,

James Jackson.
W.S. JOHNSTON, INC.

MARMON
W. S. JOHNSTON, INC
DISTRIBUTOR
44 NORTH STOCKTON STREET
TRENTON, NEW JERSEY
JAMES P. DWYER

FIG. 3. Typical Example of Dealers' Stationery. Both the letter head and business card are shown in a reduced size.

Circular Advertisements

Most manufacturers of accessories and supplies are pleased to provide catalogs, advertising material, etc., covering their products, and to print the name of the repair shop on them. These may be sent out the same as the circular letters, and form a valuable means of keeping the establishment and its product before the car owner.

Personal Calls on Prospects

It is often found good business to follow up the circular letters with a personal call.

Stock cars are usually brightened up before they are sent to automobile shows by application of new paint and varnish. This year some of the most beautiful models that will be seen in the Springfield show are being painted at Hall's Auto Paint Shop in West Springfield

FIG. 4. A Vermont Motorist reader sends us this newspaper clipping. He says: "I was sold by this publicity item in a local paper, and Hall is repainting my car."

While the letters may arouse interest in the repair shop, it may not stir him to action. And the personal call acts as a clincher. The efficiency of the personal call cannot be overestimated, providing it is properly timed, not forced, and the salesman has something he believes in and thinks the prospect should have, to talk about—whether it be engine overhaul, tire repair, or what not.

Telephone Calls

Where the prospects are personally known to the salesman; where personal calls have given a point of contact, and often where only circular letters have been sent, a telephone call may be used to complete the sale of tires, service, etc.

In one morning a salesman can call up many prospects this way—and the results—though largely depending on the personality of the salesman—are generally satisfactory. The repair shop should not scorn any medium of communication between it and the prospect.

Roadside Advertisements and Stunts

Transient trade during the touring season often forms a bulk of the trade of many stations. And it is obvious that local paper, circular letters, etc., cannot reach any amount of this trade. Roadside advertisements—particularly mileboards—are effective. These should show at a glance (a) the number of miles (b) to ..... repair shop, (c) town of ..... The business of a garage or repair shop is sufficiently well known to the average motorist to exclude the necessity of more words on the milestone, though "tires," "gasoline," "vulcanizing," etc., may be placed beneath the above on succeeding mileboards, and can be read at a glance. (See Fig. 4.)

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In the class of "stunts" comes economy tests, low speed tests, hill climbing tests, and all methods of advertising verging on the spectacular. The live repair shop owner will use these as legitimate means of keeping his establishment before the public.

Shop Fundamentals

The foregoing gives in brief the methods of getting business into the repair shop. But the old saying, "*The satisfied customer is the best advertisement*," must be remembered. And the first step in making a good impression on the customer is to have a clean shop.

In the larger shop, a janitor should be secured, having no other duties than washing windows, scraping floors, picking up dirt, waste, grease, mopping up oil, etc. In the smaller shop a few minutes each day should be set aside for cleaning up purposes; and at least three-quarters of an hour should be set aside each week end for a general cleaning up. The head of the station should make a



FIG. 4. Mileboard signs are effective, but they must be correctly placed and carefully maintained.

weekly inspection to see that the standards of cleanliness and order are lived up to.

The workmen, too, must be trained to be courteous to the customers—for a discourteous workman can cost a shop more than he earns and a courteous one increase his value. Many stations hold half-hour contact meetings every week or two weeks to discuss points of general policy and work in progress. The benefits of such get-together meetings cannot be too strongly emphasized. Each employé must be made to feel that he is an integral part of the organization—and it is by his actions the customer judges the whole establishment.

Window Displays

Window display is a large subject in itself. For a pleasing, well-arranged and clean window can attract a customer, and a dirty, poorly arranged one repel him. Window displays should be changed every week if possible. The manufacturers are glad to help and will provide displays, and these displays should be made to tie in with the advertising and circular letters that are used. For example, on the week that vulcanizing copy and letters are sent out, a tire display should be staged, and a similar program of pleasing displays should be scheduled.

Handle Nationally Advertised Goods

The accessories and supplies chosen for sale should be nationally advertised items. For here the repair shop reaps the benefits of the national advertising, can sell with less effort, and is surer of having satisfied customers. Though the profits may appear less, actually the effect of the decreased sales resistance and increased confidence more than balance.

One Price Scale and Cash Basis Business

Some repair shops do not stick to a definite price scale and play favorites. Such a practice soon becomes generally known and ruins the good name of the establishment by destroying customer confidence. One price should be charged to all.

The cash basis system is generally conceded to be the most satisfactory to customer and shop—for it enables the shop to give better service at a lower cost. And the number of customers lost through going on a cash basis is usually small—and those lost most often undesirable.

These last two items may seem foreign to a "getting business" article—but it is again to be noted that while advertising, publicity, etc., can get business *once*, it requires fair dealing, service and reasonable prices to keep that business and to give the customer *confidence* to recommend the organization to his friends.

Can We Improve Service and Parts Policies and Standard Warranty?

By E. T. Hearne, Sales Manager, Service Motor Truck Company. A paper read at the recent Motor Truck Manufacturers' Convention in New York.

This subject of service and repair parts policies and truck guarantees is one of much importance. It had been my impression, when the subject was first considered, that it would not be a difficult matter to readily indicate the deficiencies of the current policies and suggest satisfactory remedies, but upon further consideration, I am free to confess the policies and guarantee as written are adequate in fundamentals in my opinion.

Any new angles that have developed are merely supplementary, due to the consistent development of the industry. If my remarks and proposals, however, will serve to stimulate a discussion which may ultimately lead to improvement, where improvement is possible, the end in view will have been gained.

At the outset I wish to suggest substitution of the word "truck" for "car" or "vehicle," wherever the words appear. It is high time for the truck to be divorced from the passenger car, insofar as common reference is made in the standard policies and warranty.

With the growth of the motor truck industry—in the space of a few years from industrial pigmyism to the giant of today—consideration of the place it occupies in the automotive industry must be given and it must be divorced, wherever advisable, from any condition which is not apropos.

A separate standard policy and warranty should be formulated, applicable alone to the motor truck, even though much of its language, as well as its meaning, might apply to the car as well.

Standard Service Policy

I do not believe the principles of the Service Policy as outlined can be improved upon, nor do I see any necessity for discussing them until we reach the sixth point relative to the rendering of service. Here several interesting angles present themselves. It is stated, under the title "Replacement of Defective Parts," Item B, that

"Within ninety (90) days after delivery of a new car to the purchaser, the dealer will install, free of labor charges, any parts that the factory furnishes free of cost, to replace any parts determined by the factory to be defective, the purchaser to assume cost of parts and installation of same pending factory decision."

I am not stopping on this point because I think it can be improved in itself, but because it tends to create a situation oftentimes difficult to handle. Unscrupulous dealers have frequently been known to fail to give the purchaser full advantage of favorable factory decisions, a condition that should be overcome wherever it may exist.

In this connection, the right is elsewhere reserved by the manufacturer to communicate direct with the owner, a condition which frequently causes disagreeable conflict. Should the manufacturer, under certain conditions, pursue this practice, or should the dealer act as the medium at all times? On the other hand, the factory is often very slow in making its decisions, the delay creating dissatisfaction and placing the dealer at a disadvantage. Delays in transit, unidentified parts and numerous other factors frequently contribute to this condition.

The ideal condition, of course, is to educate the dealer to make only legitimate claims and, so far as possible, make his own decision without subjecting the purchaser to inconvenience, with full confidence that the factory will make a proper and fair decision.

Under the title, "Inspection and Adjustment," it is stated in paragraph (g)

"Every dealer is expected to give the same inspection and adjustment service on the cars made by this company without regard to the territory in which they were bought."

It is almost unnecessary to mention the great importance of a practical inspection system for dealers, which will serve to keep the trucks he has sold out of the shop and continually at work. An idle truck in the shop, and particularly along the road, is not a good thing for the industry in general, the manufacturer of and dealer in that truck, in particular.

The thought occurs—and it may be worthy of discussion—that with the increased radius of truck operation, due to the development of overland hauling and rural motor express

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cases of this nature may increase in number, throwing an added responsibility upon dealers who have no material interest in the invading truck.

Under the question of Service Policy, there is another point of importance which may merit discussion, and which, though somewhat irrelevant, is of extreme interest. I have in mind the question of manufacturers who maintain a corps of traveling mechanics subject to call or who make regular visits to take care of emergency conditions and to train and develop the dealers' own mechanics.

In this day and age, when gasoline engines are so prevalent and standardization is so universal, in my opinion, it should not be as necessary as formerly, to maintain such a corps, which generally has resulted in an imposition on the expert, whose time is utilized unnecessarily in doing things the local mechanic should be competent enough to do.

Standard Repair Parts Policy

The first item, "Stock of Parts," is very important and I think that it should include a more specific stipulation than that the dealer "maintain a minimum stock." Possibly the modification of this clause to read "The dealer will be required to maintain a minimum stock of parts as recommended by the manufacturer, which shall be sufficient to make running repairs on trucks operating in his territory," would be an improvement.

It is generally difficult for the manufacturer to induce the dealer to carry adequate stocks of parts. To keep the stock well balanced is important and if a permanent inventory is not too cumbersome to handle it should be employed, thus providing the manufacturer, as well as the dealer, with accurate knowledge as to the condition of parts stock.

The fifth item, "Discounts," can, I believe, be made more satisfactory by the substitution of some such clause as the following:

"The regular discount on parts will be allowed the dealer on all orders shipped into his territory, in case he maintains a service station carrying a stock of parts. However, if he does not maintain such a service station, this discount will be allowed him on material shipped direct to him only."

This will enable the manufacturer to refer the "unauthorized" representative to the service station or, in many cases, the manufacturer can directly compensate the garage owner who renders real service when required to, and who conscientiously dislikes to overcharge his patron so that he may obtain his profit.

Under item No. 7, "Return of Parts," it is stated:

"All parts shipped to the manufacturer by dealer shall have transportation charges prepaid and be properly tagged."

I suggest this addition to the sentence, "showing the name of the owner of the truck, the serial number of the truck and the date the defect was discovered." With this information complete, the manufacturer, if necessary, can communicate with the purchaser for confirmation or verification. Here I would suggest that, so far as possible, parts names should be standardized, all manufacturers co-operating toward that end.

The subject of the treatment of obsolete parts is worthy of discussion, particularly the question as to what limit of time should be given for the return of obsolete parts for credit, with the idea of maintaining thereafter only the factory stock. I believe this period should not exceed one year and should be so stated in the policy.

What price should be paid for old parts returned? Undoubtedly the price originally paid by the dealer. This will probably necessitate some inconvenience in locating old records, but is a contingency that must be provided for. Except for those companies which maintain their own branches, many manufacturers undergo considerable "grief" in connection with parts stock when it becomes necessary to make a change in representation. To partially compensate for the trouble involved, it might be well for the manufacturer to adopt a policy of reserving the right to charge the dealer for the return transportation charges as well as a certain percentage of the invoice value, in addition, if the stock is returned to the manufacturer.

It may not be amiss here to dwell briefly on the question of "resultant damages," a term that has become more or less familiar in our industry since many manufacturers engaged in war work. When a connecting rod breaks and goes through the crank case or a steering spindle lets go and the truck is ditched, how much of the "resultant damages" can the manufacturer or parts maker be made responsible for? Of course, each such case must be judged on its own merits, but I am simply mentioning this point for the sake of any discussion that may ensue.

Another thought occurs in connection with the standards parts policy. Virtually all manufacturers buy parts of one kind of another from parts purveyors, and occasionally users, from one motive or another, see fit to place orders for parts direct with the original maker. In my opinion all such orders should be referred to the truck manufacturer, who has certain interests; for instance, the improvement of his product, which is influenced to a degree by the volume of business of parts orders. This point could probably well be incorporated in the parts policy.

Standard Warranty

I would particularly recommend the adopting of a new form of warranty covering motor trucks specifically.

Inasmuch as overspeeding is as great or even a greater evil than overloading, and governors are almost universally used to overcome this evil, I believe the question of the governor should be taken care of in the warranty.

With some manufacturers whose governor is integral or enclosed, this would not be necessary, but with the majority who use governors easily accessible by unscrupulous drivers of indifferent owners (and in these days of drivers' bonuses and owners' interest in greater efficiency, there shouldn't be any such) it should be stated that the governor is not to be tampered with and the truck is not to be operated without the governor seal intact, otherwise the warranty becomes null and void.

The question of whether the dealer may regulate and reseal the governor or whether a factory representative is advisable to perform that operation, should, I believe, be left to the discretion of the manufacturer.

The first sentence in the warranty states: "Our obligation under this warranty being limited to making good at our factory, any part or parts, etc."

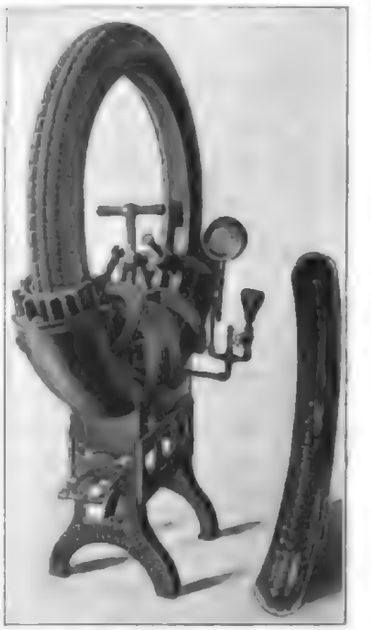
The term, "making good," is rather vague, the customer naturally having a right to assume that this includes labor charges in connection with the replacement of defective parts. The warranty covers the replacement of parts for a definite period in the event that parts prove defective in either workmanship or material.

There is absolutely no way or arriving at the amount of labor that might possibly be involved, and if the warranty included labor, then such a warranty would put a premium on carelessness. The user invariably contends that every broken part is defective, and if the guarantee included replacements of parts and labor, free, there would be abso-

(Continued on page 22)

The Wilkinson Tire Vulcanizer

This machine represents one of the latest developments of the Wilkinson dry cure process, and shows the non-skid matrix in position. Passenger and truck tires that have worn down the original tread to the breaker strip or fabric are retreaded by this machine.



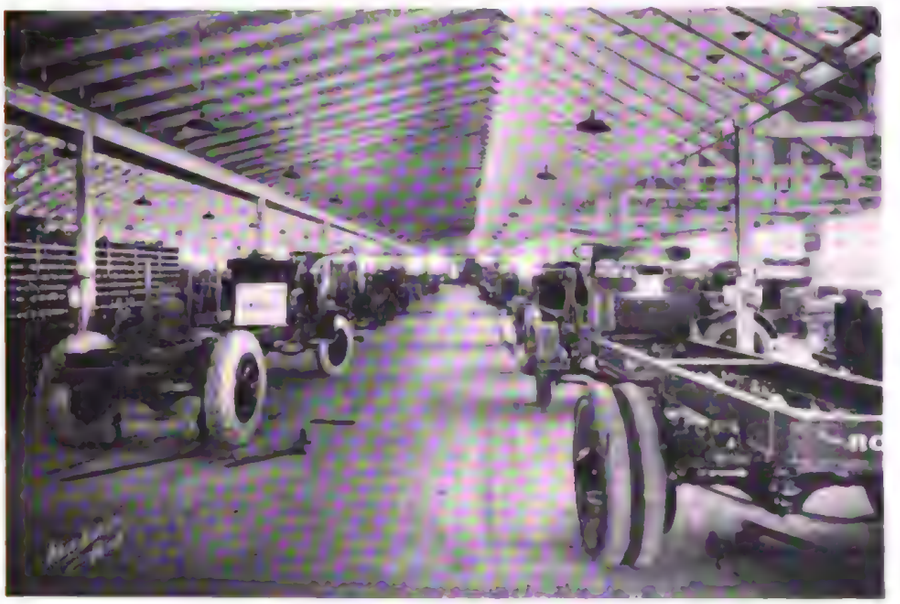
The Wilkinson Steam Vulcanizer.

By its use garage men are able to save tire users money as well as netting themselves a nice profit. No separate boiler is required, as the boiler is self-contained and is equipped with steam safety valve and gauge. Made by Wilkinson Vulcanizer Mfg. Co., San Bernardino, Calif.

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Rowe
THE PIONEER WORM-DRIVE TRUCK

Has the Plant and the Organization Behind It to Insure Service Dealers Will Appreciate :: :: ::



One of the long avenues in the spacious Rowe factory

Recent additions to our comparatively new and extensive factory make our plant one of the largest in the East devoted exclusively to motor truck manufacture.

The next three pages contain interesting particulars on Rowe Trucks—*the trucks that run right.*

The agency for your district may not be taken. Write us about it NOW

ROWE MOTOR COMPANY
LANCASTER, PA.

ROWE RUNS RIGHT ROWE RUNS RIGHT

Rowe Rowe

Rowe Model G.W.

High Speed 3-Ton Pneumatic-Tired Truck

One of the Big Winners of the Year



Travels at fast-freight speed, without injuring the engine or straining the general construction.

It is receiving exceptional attention, because it is proving its superiority for quick and economical transportation of large loads, especially in inter-city and rural express service.

It is absolutely correct in engineering principles and is fully guaranteed in every part.

ROWE MOTOR COMPANY

LANCASTER, PA.

ROWE RUNS RIGHT ROWE RUNS RIGHT

Mention THE VEHICLE MONTHLY when writing to advertisers.

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Rowe Rowe

The Wonderful Wheel

of the **pioneer high-speed truck illustrated on opposite page**



The remarkable resiliency of its 9-inch tire effectually prevents road shocks from harming even the smallest part of the truck's mechanism

Other Attractive Selling Features:--

MOTOR—50 H. P., 3¼ x 5 x 8 cylinder.

TRANSMISSION—Selective sliding gear type, four speeds forward and one reverse.

CLUTCH—Multiple disc type of special design. Raybestos and steel.

STARTING AND LIGHTING SYSTEM—Westinghouse.

STORAGE BATTERY—Willard.

DISTRIBUTOR—Atwater-Kent.

CARBURETOR—Zenith.

COOLING—By the tested and proven pump system with unusually large radiator capacity.

CONTROL—The car is driven from the left side, with control levers in the center mounted directly on transmission case. Gear shift lever has positive locks for each of the four gear positions. Spark and throttle lever, mounted directly on the steering wheel.

REAR AXLE—Worm gear housing type with Brown worm gear.

SPRINGS—Of alloy steel; semi-elliptic type.

FRAME—An original design in high carbon steel of a type found most suitable for trucks, 6" x 2" —Width 33".

LENGTH OVER ALL—18'8".

FENDERS—An attractive design in angle steel. They are joined to the running boards in the front.

ROWE MOTOR COMPANY

LANCASTER, PA.

ROWE RUNS RIGHT ROWE RUNS RIGHT

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Rowe
THE PIONEER WORM-DRIVE TRUCK

Built to Build Business for the Dealers

Simple, sturdy, always ready, and standing up to the severest tests, they make friends quickly and hold patronage.

FIVE MODELS

2-Ton, 2½-Ton, 3-Ton, 3½-Ton and 5-Ton

enables dealers to secure orders from practically every line of trade.



ROWE FIVE-TON TRUCK

Whatever the haulage problem our engineers can solve it. They're at your service to help you get business.

Write them fully when in doubt of the proper truck equipment of a customer.

If you are not acquainted with attractive Rowe agency proposition, do not lose time in getting all the facts. Some splendid territory is not yet covered.

ROWE MOTOR COMPANY
LANCASTER, PA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

"Vehicle Monthly" Time Savers

"The Vehicle Monthly" will appreciate the receipt of any "Time Saver" made by its readers. A rough sketch and a short description are all that is necessary.

(This series of "Time Savers" was begun in February, 1919. Back numbers may be had from the publishers)

"Vehicle Monthly" Time Saver No. 16
CLOTHING RACKS FOR EMPLOYES

Many repair shops have no provision for the accommodation of employes' clothing. Suitable storage space may be provided at little expense, and without using valuable work space by the use of clothing racks. These racks are simply two pieces of wood, shaped and secured together as illustrated. One is provided for each employe, and may be hung high up on the wall above the benches, or on a special rack provided for that purpose.

"Vehicle Monthly" Time Saver No. 17
TRANSFERRING BATTERY ACID

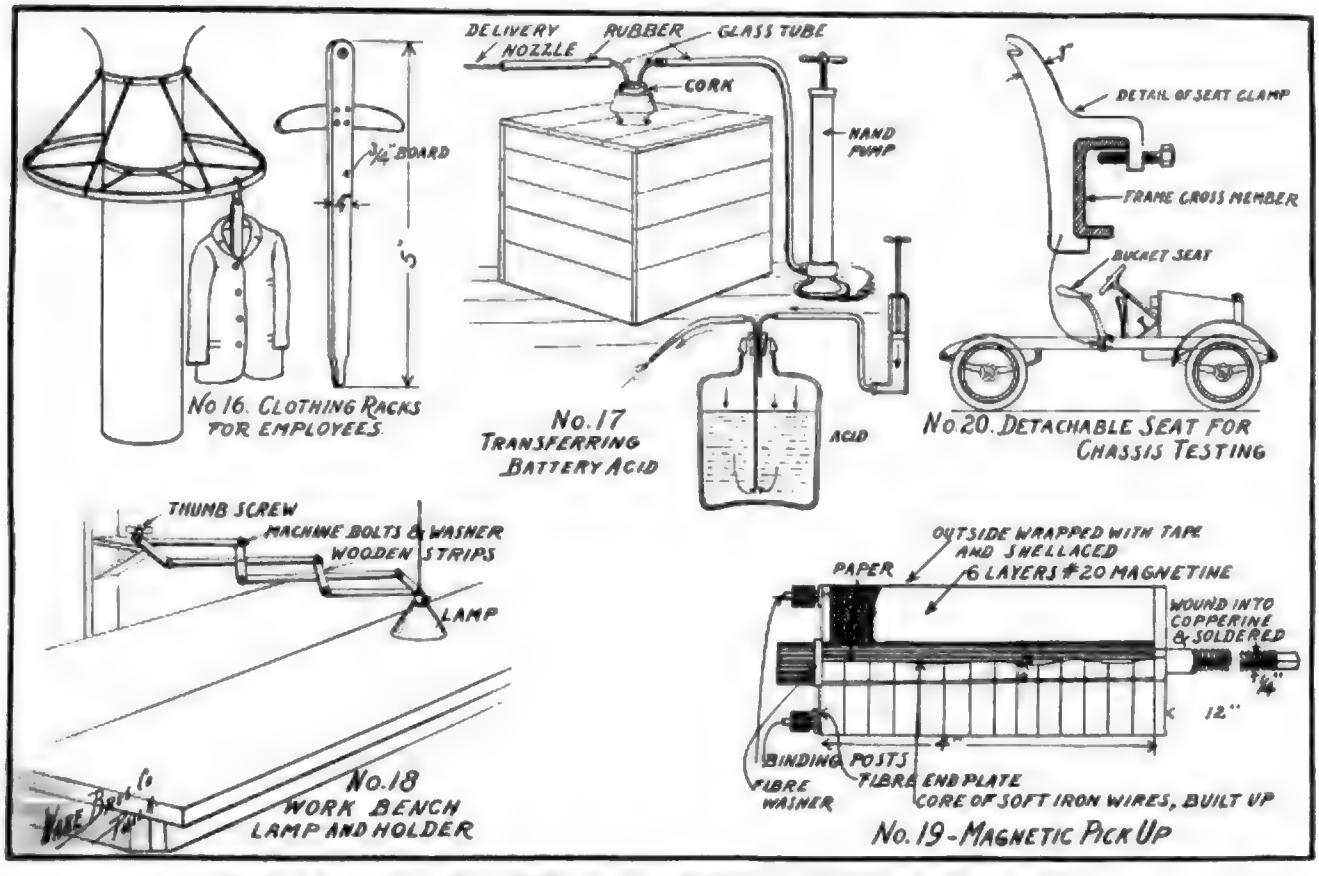
The carboys containing battery acid in wholesale lots, as used in the larger battery repair stations, are quite bulky, and it is not an easy matter to transfer the liquid from it into a small bench container. Often tilting racks are used, but these are awkward, and the acid may be spilled—an occurrence that is unpleasant and expensive. The transfer may be easily accomplished in the method shown. A special stopper is provided, bearing two glass tubes, one extending to the bottom of the container, and the other just through the cork. A hand pump is attached to the shorter tube, and a delivery nozzle to the other. By applying a small amount of pressure to the liquid, it is easily forced through the delivery nozzle and into the portable container.

"Vehicle Monthly" Time Saver No. 18
WORK BENCH LAMP HOLDER

Efficient bench work on dark days, or at night, demands adequate lighting. The light from an electric lamp may be directed and held at the desired point over the bench by means of a wooden lazy-tongs type holder. This holder is strips of ash, 1¼ x ⅜ inch, secured together in a manner permitting motion by machine screws as illustrated. One end is secured to a wall bracket by means of a thumb screw, and the other end carries the lamp. The lamp may be swung outward, or radially, and locked by this screw, and the lamp may be raised or lowered through its point of attachment.

"Vehicle Monthly" Time Saver No. 19
MAGNETIC PICK-UP

Small iron or steel parts often drop down into inaccessible places, such as crankcase or pans, and ordinarily cannot be secured except by tearing down some of the construction. Where a magnet pick-up is available these parts often may be secured with little difficulty. Such a pick-up comprises a core of soft iron wires built up for 17 inches to ¼ inch diameter, and for 5 inches to ½ inch diameter. Fiber end-washers are fitted on the larger section, and six layers of No. 20 magnet wire are carefully wound on, and the



"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ON THIS AND SUCCEEDING PAGE.

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ends brought to binding posts. The smaller extension of the core is wrapped at frequent intervals with copper wire and soldered, to hold it together. When magnetized from several dry cells, the extension may be inserted in very inaccessible parts, and iron or steel parts picked up and readily removed. The detail construction is shown.

"Vehicle Monthly" Time Saver No. 20

DETACHABLE SEAT FOR CHASSIS TESTING

After an overhaul it is often inadvisable to replace the body before testing the chassis. Where the gasoline tanks are at the rear, a detachable seat facilitates the test. This seat is of bucket type, bolted to a steel rod about one inch in diameter, bent and formed at the lower end as shown. The lower end is formed into a grip that will engage the rear cross member of the frame, and is locked in place by a machine screw or set screw.

A Great Field for Motor Truck Sales

An advertisement of the Firestone Tire and Rubber Co., printed in April, gives some real information about motor truck transportation routes out of New York City. Altogether there are some sixty-six companies operating over thirteen different routes. All of these companies are operating as "common carriers," in direct and successful competition with steam and electric railways. The extent of territory regularly covered by these carriers is revealed in the following summary of routes and distances. Note that two of the routes do nearly a thousand miles to the round trip.

When it is considered that New York is but one of several hundred cities out of which radiate highway motor transportation lines, it is seen that a vast and comparatively new field has opened for the sale of motor vehicles, and for their maintenance and repair.

Route No. 1—Distance: 128 miles round trip. New York to Port Jefferson, Long Island. Covers Jamaica, L. I.; Coney Island, N. Y.; Mineola, L. I.; Port Jefferson.

Route No. 2—Distance: 480 miles round trip. New York to Boston, via New London, Conn. Covers New Rochelle, N. Y.; Stamford, Conn.; Bridgeport, Conn.; New Haven, Conn.; New London, Conn.; Westerly, R. I.; Providence, R. I., and Boston, Mass.

Route No. 3—Distance: 468 miles round trip. New York to Boston, via Hartford, Conn. Covers White Plains, N. Y.; Danbury, Conn.; Waterbury, Conn.; Farmington, Conn.; Hartford, Conn.; Springfield, Mass.; Worcester, Mass., and Boston, Mass.

Route No. 5—Distance: 900 miles round trip. New York to Buffalo, via Albany, N. Y. Covers Yonkers, Tarrytown, Peekskill, Poughkeepsie, Albany, Schenectady, Utica, Syracuse, Rochester and Buffalo, N. Y.

Route No. 7—Distance: 314 miles round trip. New York to Wilkes-Barre, Pa., via Scranton. Covers Montclair, N. J.; Morristown, Hackettstown, N. J.; Delaware Water Gap, Pa., Scranton, and Wilkes-Barre, Pa.

Route No. 8—Distance: 200 miles round trip. New York to Allentown, Pa., via Easton. Covers Jersey City, Newark, Bound Brook, Springfield, Somerville, High Bridge, Washington, Phillipsburg, N. J., Easton, and Allentown, Pa.

Route No. 9—Distance: 802 miles round trip. New York to Pittsburgh, Pa., via "Lincoln Highway." Covers Weehawken, Newark, Elizabeth, Trenton, N. J.; Philadelphia, Reading, Lancaster, Bedford, and Pittsburgh, Pa.

Route No. 11—Distance: 200 miles round trip. New York to Atlantic City, N. J., via Lakewood. Covers St. George, S. I.; Perth Amboy, N. J., Matawan, Freehold, Lakewood, Toms River, Barnegat, and Atlantic City, N. J.

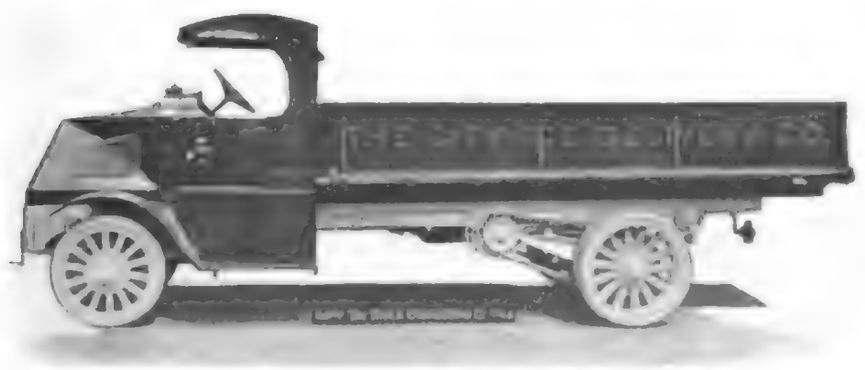
Route No. 12—Distance: 120 miles round trip. New York to Asbury Park, via Jersey Coast. Covers Jersey City, Newark, Woodbridge, Perth Amboy, Atlantic Highlands, Sea Bright, Long Branch, Asbury Park, N. J.

Route No. 13—Distance: 30 miles round trip. New York to Bayonne, N. J.

Route No. 14—Distance: 120 miles round trip. New York to West Point, N. Y., via Nyack. Covers Edgewater, Fort Lee, Englewood, N. J.; Nyack, Haverstraw, Highland Falls, and West Point, N. Y.

Route No. 15—Distance: 198 miles round trip. New York to Camden, N. J., via Trenton. Covers Millville-Hammonton, N. J.

Route No. 23—Distance: 226 miles round trip. New York to Hartford, Conn., via New Haven.



THREE AND ONE-HALF TON ICE TRUCK BODY.
Built by The Truck Engineering Co., Cleveland, Ohio.

Care of the Welding Blow-Pipe

When working with the welding blow-pipe endeavor to prevent its becoming heated to a point where it will not operate properly. The radiated heat from the part being worked on is all that need be considered. The heat from the flame issuing from the blow-pipe will not overheat the blow-pipe.

Should the blow-pipe tip be heated to such an extent that it fails to operate properly, that is, burn back of the tip instead of at the tip (commonly known as "back-firing"), first shut off the oxygen, then the acetylene, at the blow-pipe.

A pail of water should be kept handy in which to dip the hot blow-pipe, whenever the operator is welding in a hole or in a corner where radiated heat is likely to overheat the blow-pipe. When dipping the torch in water, do it carefully. Do not *plunge* it into water, but make several trials by dipping only the end of the tip, to draw the heat out as much as possible before plunging.

Before relighting the blow-pipe, turn on a small quantity of *oxygen only* to expel any steam that may have formed inside the blow-pipe.

Cleaning Out Tips

In case the welding tip becomes stopped with molten metal or flux, do not use a hard, sharp instrument to clean it out. The welding tips are carefully reamed to insure correct size and a perfectly round hole. If these conditions are disturbed by the use of an instrument harder than the tip itself, the blow-pipe will not operate properly. Use a soft copper wire if you must clean out the tip.

Cleaning Out Blow-Pipe

You will find a fine mesh screen at each gas inlet of the blow-pipe which can be exposed by removing union nuts.

The screens collect dust where it has had a chance to enter the hose. Should you find that the blow-pipe does not pass gas properly, these screens should be cleaned thoroughly.

Most blow-pipes are assembled by means of ground joint unions, no solder being used. This permits the blow-pipe to be easily taken apart, but care must be used to see that none of the unions are injured by careless handling.

Always cool a blow-pipe before changing the tip; never put a cold tip on a hot stem.

All things are cheap to the saving, dear to the wasteful.—Buy War Savings Stamps.

Waste neither time nor money, but make use of both.—Buy War Savings Stamps.

Money can beget money, and its offspring can beget more.—Buy War Savings Stamps.

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The Truck Industry for 1919

By Willard J. Graham, Sales Department Graham-Bernstein Motor Truck Co., Lima, Ohio.

I have been asked a great many times, by various people, what I thought of the prospect of good motor truck business for this year of 1919, which we are just starting.

Having had an opportunity to talk with a great many men in the motor truck industry, and also a great number of officers connected with the motor transport work at Washington, I can perhaps outlive a few theories which seem to be current in this country at the present time.

The general opinion among the buying public seems to be, that if they wait for a few months, motor trucks and pleasure cars will be considerably cheaper, but when one considers the matter from all angles, it is easy to see that this idea is erroneous.

The two factors which control the price of any motor vehicle, labor and material, are just as high now as they were during the war, and there is no reason to believe that they will be appreciably reduced for at least six months.

One might think that the large production of steel in this country would cause the price to go down, but we must consider the fact that the European countries are ordering steel in vast quantities, with which to repair the damage wrought by the ruthless warfare methods of the Hun. Then, too, the United States Government is allowing steel to be used for a great many purposes, such as bridges, buildings and other public improvements, for which it could not be spared during the war. All of these factors will tend to keep the price of steel just about where it is for some time.

We all know that the labor condition of this country is very unsettled, and it will take time for it to readjust itself. No doubt, the price of labor will be considerably reduced in a few months, but it will be only after a continued fight in which capital will not have to play a very great part. I do not think the price of labor will be as low as it existed before the war, but it will certainly be less than it is now. This reduction in the price of labor will be caused not only by the flooding of the country with more than enough labor to take care of its needs, but will also be caused by a reduction in the price of foodstuffs. We all know that the cost of living must be reduced before a great material change can be expected in the cost of labor.

Many men are returning from the front who have been trained as experienced mechanics in the motor truck industry. This means that more people will be interested in motor trucks, and that motor vehicles of all descriptions will receive much more careful and intelligent care than they have ever received before. It is to be expected that the over-supply of labor which desires to enter the automobile field will cause the price of labor to reduce.

Another rumor current among automobile consumers is that the Government will probably dispose of large numbers of motor vehicles at public auction, and many prospects are awaiting this time, thinking that they can purchase motor vehicles very much more cheaply in this manner.

This would be true if the Government intended selling any motor vehicles at public auction. However, I recently returned from Washington, where I had the pleasure of talking to Colonel Fred. Glover, Q. M. C., Chief of the Motors and Vehicles Division, about the same situation. In a recent letter to the National Automobile Chamber of Commerce, Colonel Glover stated:

"There is no basis in fact for the rumor that the Government intends to put on sale all trucks and motor passenger cars that are now being used for war service.

"The Director of Purchase and Storage advised me that there is being prepared a public statement which relates to this matter and which will put at rest any uneasiness which now obtains in automobile circles."

There is no definite information as yet regarding the number of surplus trucks which will be on hand after the peace army has been provided with its requirements. No one knows as yet just what supply of trucks will be considered necessary by the War College to maintain our regular army upon a peace basis. It is quite evident at this time that there will not be a very great number of vehicles to dispose of on the open market, and there probably will be none.

The War Department may be depended upon to make every effort to dispose of any surplus which may develop in a manner which will cause the least disturbance possible to trade, and there will be no wholesale flooding of the market through auction sales or through sales to private individuals. A very great many of these army trucks will be used by the post office, which is beginning to take over large numbers, as well as by various other Government departments. Every endeavor will be made to protect the motor truck industry and the individual purchaser so far as possible.

There is very little likelihood of the American motor vehicles now in France being brought back to this country, inasmuch as there is enough need for them over there, and the labor of bringing them back would amount to as much as their value on this side.

The French Government is already disposing of a large number of vehicles at public auction, and as the motor truck factories of Europe will probably be unable to start operations for some considerable time, the European requirements will absorb all of the motor vehicles which are at this time on the continent.

Many people believe that the large quantities of motor vehicles which will, in all likelihood, be produced in this country during 1919 will force the price down. It is very true that a great number of vehicles will be produced, in fact, nearly all truck factories since the beginning of the war have increased their outputs to more than double, in many instances, their largest production previous to the war. This has meant the increasing of floor space and the installation and the doubling of large forces of executives and workmen. There is no doubt but that each of these factories will try to keep up, as nearly as possible, during 1919, the large output which they have been producing during the war.

No Danger of Flooding the Market

Ordinarily one might think that this would mean a flooding of the American market, but we must remember that at the same time we must temper this conclusion with the fact that a very great number of trucks will be exported.

Take South America for example—this country has been able to obtain, during the war, hardly any motor vehicles, although their needs have been greater than they were before the war, due to the increased production of foodstuffs and other materials such as this Southern continent produces. These Latin-American countries are beginning to order motor vehicles in large quantities, and there is no doubt but that they will take a very large part of the big production of trucks built in this country.

Then, too, we must consider the requirements of the Asiatic countries. Japan is just realizing the importance of motor vehicles, and has established large Government-owned garages and workshops, where motor trucks can be maintained and kept in good running order. The Chinese are also beginning to order motor trucks, and the people of the Pacific Islands have realized for some years the importance of this method of transportation.

As to the potential buying power of Russia, one can surmise very little until the political situation of that country has been cleared up, but it is safe to assume that in a few years large numbers of trucks will be required. Practically all of Russia's manufactured requirements must be imported, and the United States is now the chief manufacturing country of the world. The railroads of Russia are few and extend over a very small part of the populated area. There are hundreds of small isolated villages which very rarely are able to connect with one another. The motor truck will become an important factor in the transportation facilities of this vast country, and there is no doubt but that in the near future we may expect to see the motor truck taking the place of the railroad for short hauls, just the same in foreign countries as it is in this country.

When we consider the motor truck export trade, we must also consider that in the next two, or probably more, years we will have very little interference from any of the countries which formerly competed with us to the greatest extent, as they will not recover so quickly from this world war as will we.

I do not see any reason why the prospective consumers of this country need hesitate about buying their 1919 motor truck requirements, and I see no reason why the American motor truck manufacturer need have any doubt as to his 1919 business.

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It is true that a great many small and new truck concerns have just started into business. In fact, there are over two hundred companies listed which were not in business previous to the war. In the writer's opinion, however, these will gradually thin out until the old line manufacturers, with perhaps the addition of a few new and stable concerns, will take their places in much the same manner in which they retained them previous to the war.

Considering every factor, it seems that 1919 should be a successful year for the truck owner, the truck dealer and the truck manufacturer.

Can We Improve Service?

(Continued from page 14)

lutely no incentive for the owners or drivers to take any care whatever in the handling of their trucks, as they would feel that any breakage would come under the guarantee and cost them nothing.

Necessarily, the broader the guarantee, the more money must be added to the original price of the truck, and it is not a fair proposition to penalize the owner who takes good care of his truck or the driver who uses his head as well as his hands, in order that the careless, shiftless drivers or owners who pay no attention to their trucks should not be asked to pay for labor caused by carelessness or inattention.

Any truck that is sold under a guarantee including cost of labor in replacing parts, either has an amount added to the price to cover that guarantee or is made up of an inferior engine, transmission or other vital parts. I should, therefore, think that it would be well to add a clause to this effect—"It is understood this warranty does not include labor or any other expense involved in installing a part." We state in our service policy, however, that "the company *expects* the dealer to install, free of labor charges, any parts that the factory furnishes free to replace defective parts.

In reference to the warranty on tires and accessories, criticism is frequently encountered because the truck manufacturer assumes no responsibility, but nonchalantly dismisses the subject with the explanation that the respective manufacturers warrant their own product.

This has never seemed to me to be a thoroughly business-like proposition and, in my opinion, at least, some expression of co-operation on the part of the truck manufacturer toward a satisfactory adjustment for the purchaser should be indicated in connection with this clause. Frequently the tire representative or the accessory agent is found to be indifferent, especially when he feels he is handling some other fellow's grief for which he generally gets no material compensation.

I do not believe in such a case that we should leave the user out in the cold, but rather do all in our power to grasp this and similar opportunities to retain his good will. Every manufacturer is naturally jealous of his reputation and anxious to maintain a high standard of business dealing which will assure users of his product a full measure of co-operation.

In this connection, so long as it is necessary to have a warranty covering our products (and that will probably be always) I am of the opinion that it could be so revised in letter and spirit as to indicate a little more consideration for the user, correspondingly benefiting the industry and with no sacrifice of interest on the part of the manufacturers.

Water-Resistant Glues

Water resistant glues are of two general types, those made from blood albumen and those made from casein. All blood albumen glues are made directly from the raw ingredients at the time the glue is to be used.

The manufacturers using these glues make them by their own secret formulas, and there are no published formulas available. Casein glues are made from casein, which is obtained from milk. They can be obtained in the prepared state ready for mixing with water, or they can be made directly from the ingredients at the time the glue is to be used.

Directions for mixing the prepared glues can be obtained from the respective manufacturers.

The water resistant qualities of casein and blood glues are well demonstrated by the acceptance test imposed on plywood manufactured with these glues for use in airplanes. Samples of the plywood are boiled in water for 8 hours or soaked in cold water for 10 days. An acceptable product will show no separation of the plies under such treatment.

The shearing strength of casein and blood glues in plywood for airplane use is required to be at least 150 lbs. per sq in. Most of the plywood tested by the Government experts showed values considerably higher than this minimum requirement. In general, veneer panels glued with blood glue show higher average strength under the varying conditions than those glued with casein glues. It seems possible, however, that casein glues will in time be developed which will be the equal of blood albumen glues in this respect.

Both casein and blood glues are materially weaker wet than dry. Casein glues tested wet commonly have 20 to 40 per cent. of their dry plywood shear strength, and blood glues 50 to 75 per cent. When plywood using these glues is redried after being soaked, however, the original strength of the glue is very largely recovered.

Blood glues are not at present commonly used for gluing anything thicker than veneer. Casein glues are used for gluing all thicknesses. Casein glue test joints, using blocks of maple with the grain running in the same direction, commonly have a shearing strength of 2,000 to 2,500 lbs. per sq. in.

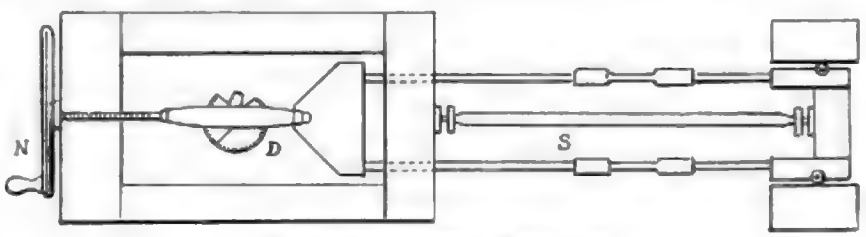
Two Tests for Airplane Struts

In the field of testing, slender struts are unique. No other structural members can be tested to maximum load without injury, nor will they permit of the securing of data for an accurate computation of the maximum load, but with slender struts either of these things can be done very simply. The following two methods have been developed and verified by the Forest Products Laboratories as of practical application in strut inspection.

First Method of Test

The strut may be loaded as such, increasing the load gradually till the maximum is reached—that is, until the load ceases to increase with increasing deflection. Repeated experiments on Sitka spruce and Douglas fir airplane struts of various patterns have shown that, if stopped at this point, the test does not injure the strut, provided the slenderness ratio (L/r) is 100 or more. The sketch below illustrates a simple machine by which struts may be tested in this way at the rate of 100 or more an hour.

The strut S is supported on knife edges. The load is applied by a handscrew H and is measured by a dynamometer D. The screw is turned until the pointer of the dynamometer ceases to move; the load then recorded is the maximum load of the strut.



A SIMPLE STRUT TESTING MACHINE.

Second Method of Test

The strut is tested as a beam. It is supported by a knife-edge at either end and loaded in the middle, one knife-edge being placed on a platform scale to measure the reaction. The reaction R and corresponding deflection d are carefully measured for one or more loads (safely within the elastic limit). The ratio

$$\frac{2R}{d} = p,$$

which is constant up to the elastic limit, may now be substituted in the formula,

$$Q = 0.206 \frac{l^3}{L^2} p$$

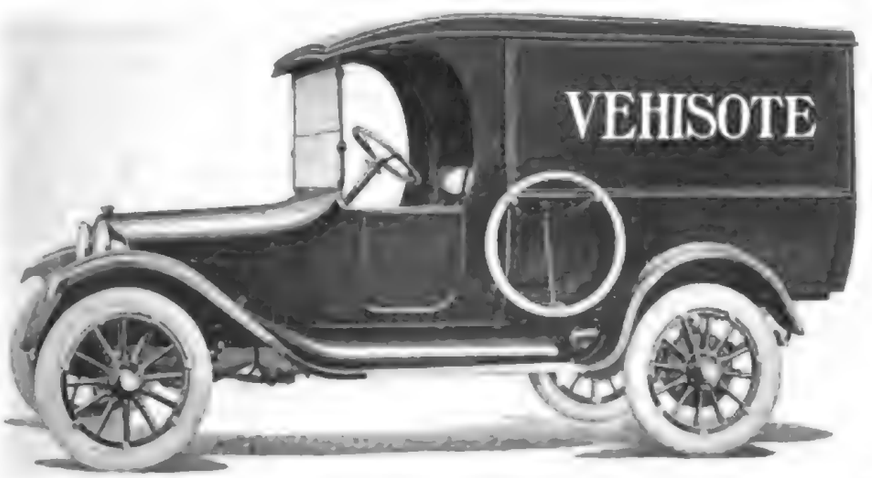
where l = span used in beam test
L = effective length of strut
Q = Euler or maximum load of the strut as such (pin-end conditions)

Numerous tests on Sitka spruce and Douglas fir struts have proved that this method can be relied upon to give the maximum load to within about 5 per cent. of the correct value for struts which have a slenderness ratio of 100 or more, and are uniform in cross-section or tapered not too severely.

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BODY DEPARTMENT

56,000 VEHISOTE paneled or closed delivery bodies have been built in the last two years; each one speaking a good word for VEHISOTE.



VEHISOTE is in one piece and provides a smooth jointless surface which is absolutely water-proof and cannot split or separate.

VEHISOTE is a homogeneous individual material made by a distinctive and special process.

Like Steel, VEHISOTE is made by a fluxing and moulding process which interweaves and interlaces the fibres in one complete fabric.

When ordering a new body or replacing defective panels on your present bodies, personally see that VEHISOTE is used.

Samples and Information Gladly Given Upon Request

THE PANTASOTE CO. 11 Broadway NEW YORK — Peoples Gas Bldg. CHICAGO — Penobscot Bldg. DETROIT

JOBBERS

The Scovel Iron Store Co., San Francisco, Cal.
Sligo Iron Store Co., St. Louis, Mo.
E. D. Kimball & Co., Chicago
E. C. Kadow & Co., Chicago
E. J. Coyle & Co., Chicago
C. H. Tiebout & Sons, Brooklyn, N. Y.
N. Langler & Sons, Brooklyn, N. Y.
H. D. Taylor & Co., Buffalo, N. Y.
W. E. Kleine & Co., New York City
H. Hett & Sons, New York City
W. T. Crane Cge. Hdwe. Co., Newark, N. J.
Gerhab & Ludlam, Philadelphia, Pa.
Chas Schick, Trenton, N. J.
Moasman-Yurnelle Co., Fort Wayne, Ind
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SUPREMO

PAINT AND VARNISH REMOVER

For Automobile and Carriage Work

Stays wet long enough to penetrate through the old hard coats, which are then easily removed.

Carried by Paint Jobbers in most cities

WRITE DEPT. A FOR INFORMATION AND PRICES

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Manufacturers of

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CARPENTERSVILLE, ILL.

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Motor Bodies and Parts

"Sears-Cross" Automobile Door Locks

In keeping with the many improvements brought about in motor car construction, motor car manufacturers and body builders have long felt the need of greater efficiency in door locks.

The "Sears-Cross Lock" with the expanding latch feature (manufactured under the Ottinger patents) embodies in its construction and functions every point which the ordinary door lock lacks, viz: It prevents rattling of doors; insures safety protection against doors opening accidentally; overcomes difficulty in opening and closing of doors, and automatically takes up wear.

Prevents Rattling of Doors

The ordinary type of locks do not permit doors to operate satisfactorily. They lock the doors to a loose fit, and the rubber pressure pads take up the play. When the rubber pads are new the doors are hard to close, for it is necessary to slam them with great force, as the rubber pads must be compressed to permit the lock to function. This not only strains the doors, but they seldom close safely and are difficult to open. As the rubber loses its resiliency through constant compression the doors rattle.

The illustration shows The "Sears-Cross Lock" with the expanding latch (magnified), installed on the door of a closed body. Attention is drawn to the use of fiber stops. These non-yielding stops are used because the outward pressure of the rubber pads is taken care of by the inward pressure of the expanding latch, which holds the door tight so that it cannot rattle. Stops are used only to protect the paint. They last indefinitely when used as stops and not as pressure pads. The holding pressure is supplied by the lock

Insures Safety

It is mechanically incorrect for doors to be held closed by outward pressure constantly forcing them towards their own position. Only the latch prevents the doors from springing open, and if insufficient force has been used, not only in compressing the rubber but in warping the doors into place, the latch will not seat properly; a slight jar of the car while in motion has a tendency to open the doors, and accidents may occur.

This cannot take place when doors are equipped with the "Sears-Cross Lock." As the door closes the latch is projected into the recess behind the striker approximately three-quarters of its length before it starts to expand: after having passed this position it immediately expands and tightens the door firmly, making accidental opening of doors impossible.

An Efficient Door Lock

The opening and closing of doors is always difficult with ordinary lock and door construction. This difficulty is overcome with the "Sears-Cross Lock"; as the door closes, the latch slips behind the striker and the door is positively closed and unyielding one way or another. To open doors, the pressure of the expanding latch is relieved at once and the doors open easily. The operation of opening and closing doors only requires a gentle push or pull, as there is no friction to be overcome between the latch bolt and the striker caused by the outward pressure of the rubber pads.

Economy in Cost of Installation

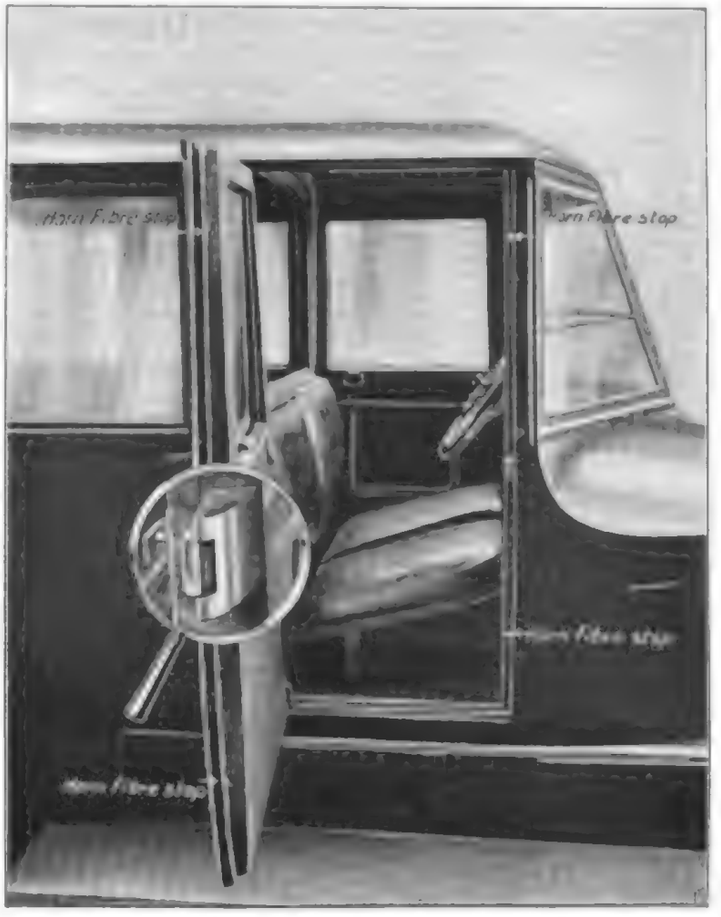
As standard equipment the "Sears-Cross Lock" effects an economy in installation. The fiber stops are less expensive than rubber stops, which are of uncertain quality and not uniform. With fiber stops all parts of the door may be jigged and assembled, saving the labor of fitting. The cost of plates or castings for holding the rubber stops is eliminated.

For All Priced Cars

This type of lock has been subjected to thorough investigation and severe tests by many motor car manufacturers and body builders with most satisfactory results.

With the company's large equipment of modern automatic machinery and excellent factory facilities making it possible for them to manufacture locks in volume quantity as daily production, they are in position to offer the "Sears-Cross Lock" as standard equipment to motor car manufacturers and body builders for all makes of cars ranging from the less expensive to the higher priced. Prices quoted on request. Write for a booklet describing and illustrating the operation of this lock.

Address Sears-Cross Co., Bush Terminal, Brooklyn, N. Y.



"SEARS-CROSS" AUTOMOBILE DOOR LOCK.
Showing lock in magnified view and the horn fiber stops.

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Scratched Joints vs. Smooth Joints in Glueing

The common assertion that scratched surfaces make stronger glued joints than smooth surfaces seems hard to prove. Comparative tests made on several occasions by Government experts all indicate that the strengths of these two types of joints are practically the same.

The test specimens used by the Government laboratory were pairs of hard maple blocks, some with smooth and some with tooth-planed contact surfaces. These blocks were glued with a high-grade hide glue, allowed to stand for a week, and then sheared apart in an Olsen universal testing machine. Four joints of each type were compared in a single test.

Eleven such tests gave the following average results:

COMPARATIVE STRENGTH OF SCRATCHED AND SMOOTH JOINTS

Test	Scratched Joints: Shear Strength	Scratched Joints: Wood Surface in Failure	Smooth Joints: Shear Strength	Smooth Joints: Wood Surface in Failure
No.	Lbs./Sq. In.	Per Cent.	Lbs./Sq. In.	Per Cent.
1	1,787	25	1,855	..
2	1,366	..	943	..
3	1,976	..	3,086	50
4	2,409	75	1,571	25
5	2,298	100	2,416	100
6	1,947	75	1,678	62
7	2,310	12	1,800	..
8	1,835	100	2,455	100
9	1,425	..	2,180	25
10	2,330	..	2,395	62
11	2,180	..	2,520	75
General average	1,988	35	2,040	45

It will be noted that in seven of the eleven tests smooth surfaces gave the better adhesion. Consequently it would seem that there is no advantage in tooth-planing wood for glueing purposes.

Haskelite—An Efficient Paneling Material

It is safe to assume that body builders want to build stronger, more durable, better and finer looking bodies or truck cabs, if it doesn't greatly increase their costs. This being the case, it would be well to earnestly consider the use of "Haskelite," the waterproof, moldable plywood, because:

Exhaustive tests made by U. S. Government bureaus and the "Haskelite" research laboratories prove "Haskelite" to be capable of withstanding severe strains and shearing tests, even in a water-saturated condition. It is an absolutely waterproof plywood.

"Haskelite" is fundamentally an engineering material and its great strength qualities, permanent waterproof feature, ability to withstand severe shocks and vibrations, as well as to take an excellent finish at small cost, mean added features to all bodies in which it is used.

"Haskelite" molded plywood in the roofs, and "Haskelite" dashes, instrument boards and base boards mean additional strength without increase in weight; it means a plywood the plies of which will not separate or shear; it means a guaranteed waterproof plywood possessing such strength that you can eliminate the costly rib construction.

"Haskelite" molded auto roofs have so far held a test load of 1,007 pounds. The roofs, when molded to form, cannot show waves.

The Haskelite Manufacturing Corp., 120 Broadway, N. Y., guarantee their product to the very limit, and, as the annual capacity of their two plants is thirty million feet, it means speedy delivery of your requirements, thereby enabling you to increase your production.

"Haskelite" is being used extensively in commercial bodies, side panels and tops, hearse linings, mounds and roofs, truck cabs, passenger car molded roofs, dashes and instrument boards.

Send this company your initial order today—no matter how small it may be. All they ask is that you give "Haskelite" a trial; then they believe they will receive regular orders based on your needs.

The Correct Welding Flame

It is necessary at all times that the welding flame be neutral, that is, that there be no excess of oxygen or acetylene. A correctly adjusted (neutral) flame is shown at B of Fig. 1. It will be noted that the inner cone is clear, and well defined. A of Fig. 1 shows a flame having an excess of acetylene. The inner cone is ragged in appearance. To make such a flame "neutral," the acetylene should be cut down by reducing the pressure either at the regulator or at the blow-pipe, or by increasing the oxygen supply. C of Fig. 1 shows an excess of oxygen. The inner cone has a very pale violet color and is shorter than the cone in the neutral flame at B. Proper adjustment, in this case, is accomplished by reducing the oxygen pressure or increasing the acetylene pressure at the regulators or at the blow-pipe.

The beginner will be able to get a correct adjustment of the flame more easily, and with absolute certainty, by first opening the blow-pipe valves wide and then adjusting the oxygen and acetylene pressures at the regulators, starting the adjustment with a *slight excess of acetylene*, as indicated by the ragged appearance of the flame, and then slowly throttling the acetylene until a clear, *well-defined inner cone is obtained.*

The regulation of the welding flame really means the regulation of the white inner cone. This cone should always be as large as possible, provided its outline is sharp and distinct. A long, clear inner cone should always be sought. The gases should be readjusted several times, if necessary, until the desired result is obtained.

When the blow-pipe is first lighted, it is cold. Radiated heat from the molten metal

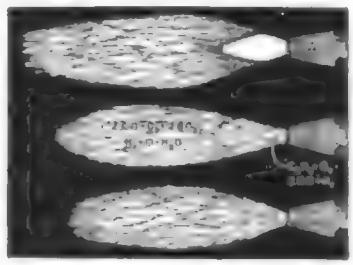


Fig. 1. The oxy-acetylene flame. (A) shows a welding flame with an excess of acetylene. (B) shows a correct neutral welding flame. (C) shows a welding flame with an excess of oxygen.

will gradually warm it. This is apt to affect the welding flame slightly. It usually will be found necessary to make readjustment of the gas pressures by means of the oxygen and acetylene needle valves on the blow-pipe after the blow-pipe has been at work for a few minutes.

Effects of Improper Regulation — It should be remembered that steels and cast iron are combinations of iron and carbon. It will be appreciated, therefore, that if the welding has an excess of oxygen, the metal will be decarbonized or oxidized, and the nature of the metal changed.

On the other hand, molten iron or steel will *absorb carbon*. Thus excess of acetylene in a welding flame will carbonize the metal. This should be avoided, except in special cases where it is desired to carbonize mild steel.

Chemistry of Oxy-Acetylene Flame—Acetylene (C_2H_2) is composed of carbon (C) and hydrogen (H). On combustion, the carbon combines with oxygen to form carbon dioxide (CO_2) and the hydrogen combines with oxygen to form water vapor (H_2O). This takes place in the following manner:

When the gases issue from the blow-pipe into the welding flame, the acetylene immediately dissociates, in other words, it *splits up* into carbon and hydrogen which in combination with oxygen form respectively carbon dioxide and water vapor. In consequence of the high flame temperature (6,300° Fahr.) the water vapor formed by this primary combustion, is immediately dissociated into hydrogen and oxygen. The oxygen assists in the burning of the carbon while the hydrogen (which can only combine with oxygen at a temperature 4,000 Fahr.) passes away from the high temperature zone and combines with the oxygen of

(Continued on page 52)

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Freight Route Body With Cab

For a Chassis Having 130-Inch Wheelbase

(For Working Draft, see page 28)

The length of cab outside on posts is 42¾ inches, and length of main body is 117 inches, making 159¼ inches in all. The inside length of body is 112 inches; the outside width is 72 inches and inside width is 67 inches. All these dimensions are incorporated in the working draft.

One hundred and seventeen inches, the outside body length, is the shortest that is made for this length of frame of 156¾ inches, and can be extended 18 inches, making the entire body length 135 inches, in case this length is needed.

The outside width of the cab on this working draft is 54 inches, but this width can be reduced to 50 inches or increased to 64 inches, as shown on the Pierce-Arrow cab. (See THE VEHICLE MONTHLY, September, 1918, page 14.)

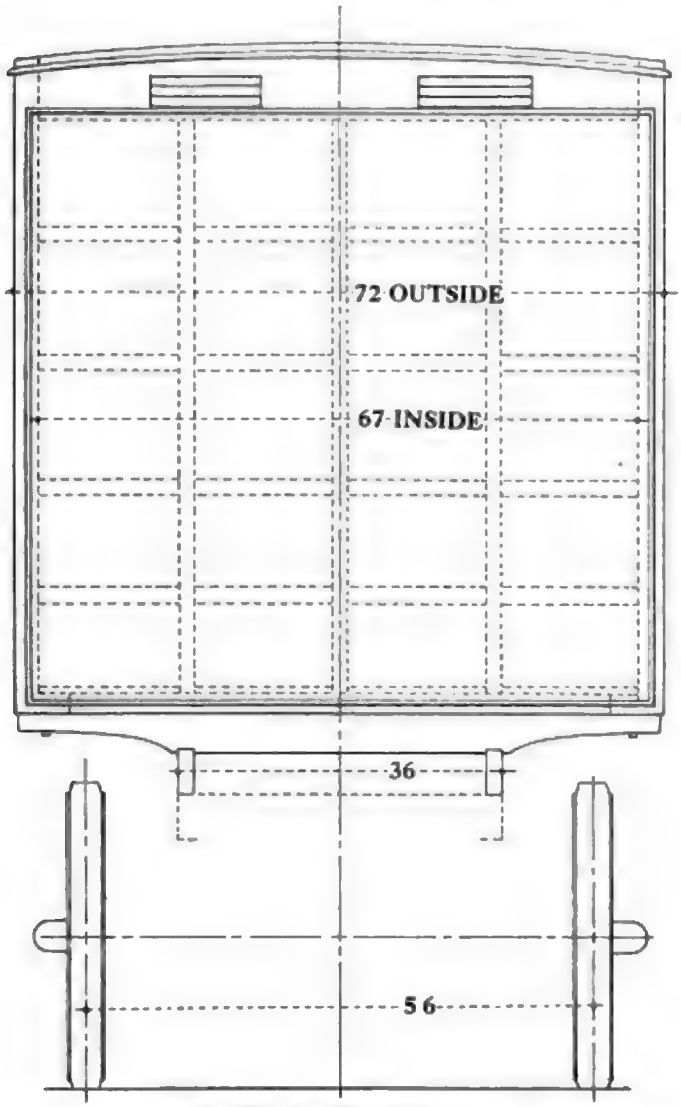
Construction of the Cab

There is a great difference in the construction of cab bodies. Some have doors, but a great many are built without them. If built with doors, the glass frames for rear side quarter and doors are made in a great variety; some are made to drop, same as on coach work; some are hinged on top or on rear end, swinging toward the back, or locked with catches so that they can be removed easily.

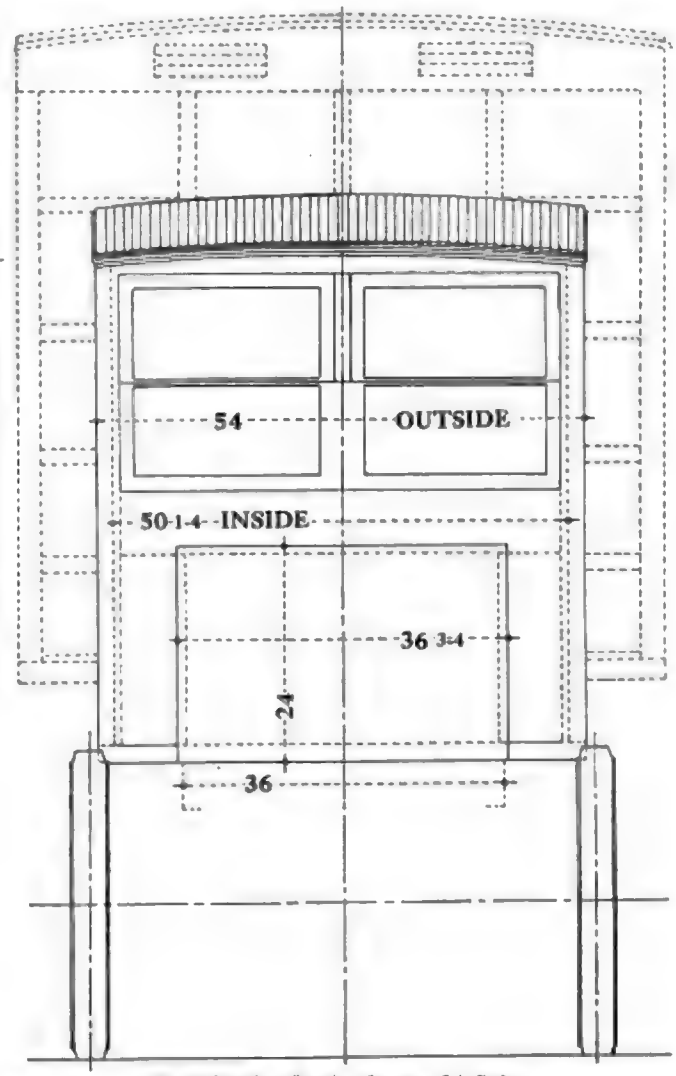
Some bodies are paneled and molded, while others are plain, as shown on this working draft. They are also frequently covered with metal. Some of the best finished are paneled or covered with composition panels on inside surface.

The top is generally slatted with 1 to 1¼-inch strips, ⅛ or ⅜ inch thick, ½ to 1¼ inches apart, covered with suitable cloth; the edges covered with half-round or drip moldings.

On account of the lengthwise curve, and also the curve across the body, when entirely covered, panels not over 4 inches wide are used, glued at the joints. This makes a more durable top, which is covered same as the slat tops. The front part of cab, without doors, is generally covered with shifting curtains with lights in the curtains. With doors, regular windshields are used, with fixtures made specially for trucks. This part is best shown on front elevation of body, and a separate illustration of lock fixture is printed on page 29.



Front Elevation, Without Cab Body.

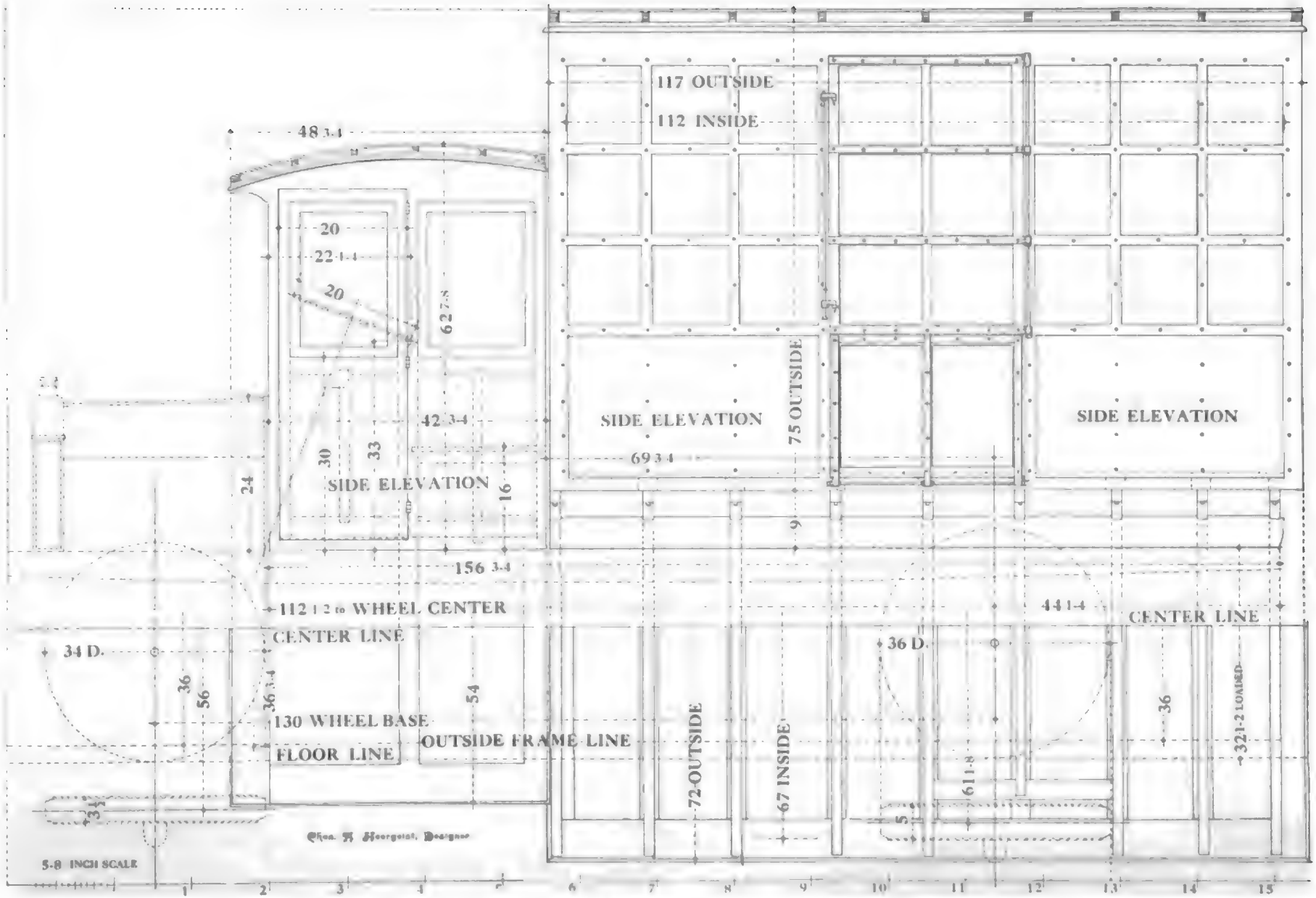


Front Elevation, Showing Separate Cab Body.

FREIGHT ROUTE BODY WITH CAB.

The construction of the main body differs somewhat from the drafts we have illustrated heretofore. The four inside posts, each side, are cut short on the lower rail and strengthened with inside iron stays running from top to bottom, with corners across the sills. The same iron stays are used on the four door posts on side elevation, two on each side of body. This leaves a blank space on each side of doors and corner posts for lettering. On the Beam-Fletcher Corporation (Philadel-

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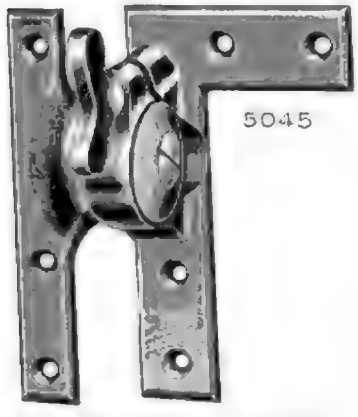
WORKING DRAFT OF FREIGHT ROUTE MOTOR TRUCK BODY, WITH CLOSED CAB

(See Description on page 27)

phia) bodies, the body is divided by five posts, and two lengthwise rails, between which the lettering is placed.

Besides these parts of the body where lettering is placed, there is the top rail and lower spaces between lower rail and sill, which can be filled with lettering, if desired. On this working draft the lower large spaces are preserved for this kind of advertising.

Most of the side and rear end doors on freight-carrying motor bodies have been hung on plain, straight door hinges. These



TRUCK WINDSHIELD FIXTURES.

This type of windshield fixture is made by Jos. N. Smith & Co., Detroit, Mich. The brackets fasten to the pillars of the cab, and the angle plate to the sash, permitting satisfactory swinging of the windows forward or within the cab as desired. Better weathering conditions can be effected, however, by swinging forward only, and letting the window, in closing, come against a permanent stop. The joints may be set at any desired tension by using the thumb-screw for locking in any desired position. Finishing of bodies and windshields before attaching these fixtures, which do not require any fitting, offer exceptional conveniences on new work, and they can also be fitted on old windshields.

hinges, for coach and carriage doors, have served their purpose, but for freight-carrying motor bodies, they are not what is wanted.

These hinges have been improved by Parsons Manufacturing Company, Detroit, and are illustrated in our January and February, 1919, numbers. These hinges are superior to the plain, straight hinges, which either break or are torn away from the three screws. The Parsons hinge is a great improvement over the plain hinge.

On this working draft we have adopted another hinge, which has been used on drop gates for years and has stood all the rough treatment a tail gate is heir to. These tail gates have been bent and smashed, but the hinges and their fastenings have stood the extraordinary usage. On the sides of body the gates are secured to the sills with three hinges for each gate, and a rod passing through the hinges and the bolt. The center hinge has two bolts. On one side of the rod is a solid bolt head and on the other end a nut. This nut is threaded to the rod and riveted so that the nut keeps in its place. The same rod is used for the side doors, there being four hinges and four supports for each door. These supports are bolted through the door pillar, with a nut inside for each bolt. The hinges cross the entire door, same as the tail gates.

The only damage which can be done to the doors is splitting the door pillars to which the doors are bolted, but this can be prevented by using two wood screws on each side of the bolt. There is also a new door fastener which locks top and bottom. This consists of a rod moving up and down in a round hole and dropping in a square hole. The square bolt keeps the door closed. There is a handle on the round rod, which is used to raise and lower it.

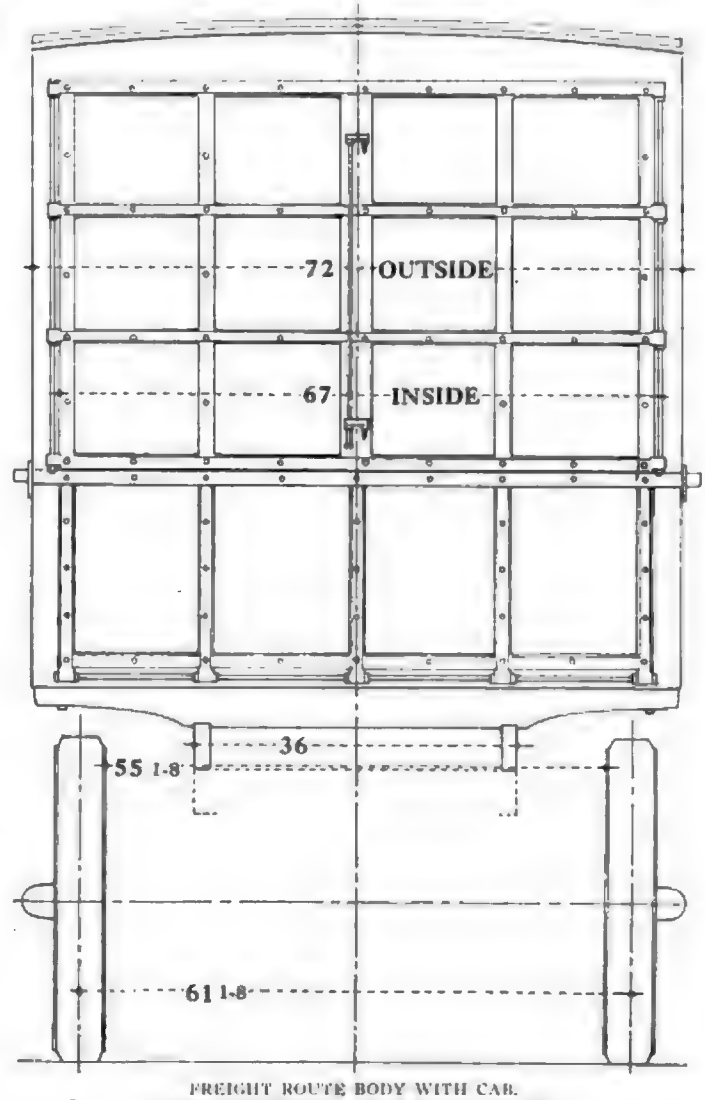
The Construction of Motor Body Tops

Since freight-carrying motor bodies have been made, problems which have not presented themselves before have shown the motor truck builder how to improve the quality of trucks and especially the top construction, so as to avoid consequences of excessive vibration. Time has shown that the close paneled top board lifts from the curves and the nails with it, the nails lifting out of the boards, and, of course, the water will enter through the nail holes. Vibration may be part of the cause, and most of the cause, for the nails lifting out of their places, but our opinion is that contraction and expansion also do their share in drawing the nails either out of the curves or out of the boards.

On this supposition a patent has been granted to do away with the nails over the entire surface of top, except at the edges. Thus the top has the facility to contract and expand under the various conditions of the atmosphere. To effect this, the top is built with curves as usual, and covered with strips ⅞ x 3 or 4 inches, at an angle of 45 degrees, one above the other. In other words the strips cross each other at 45 degrees, leaving a space of two inches between each strip, without any nails through strips or into the curves, except into the side rails and end cross rails.

This patent is, we suppose, to avoid contraction and expansion. But does it make a satisfactory top? With such a top there is a checkered surface and the top surface must

(Continued on page 49)



FREIGHT ROUTE BODY WITH CAB.
Finished Back Elevation, with Doors and Tail Gate

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Part E——Lesson 24. Obtaining Curves of Seat Panels Direct from Bottom View

(Continued from pages 32 and 33, April, 1919, of "The Vehicle Monthly"). (For description see page 31).

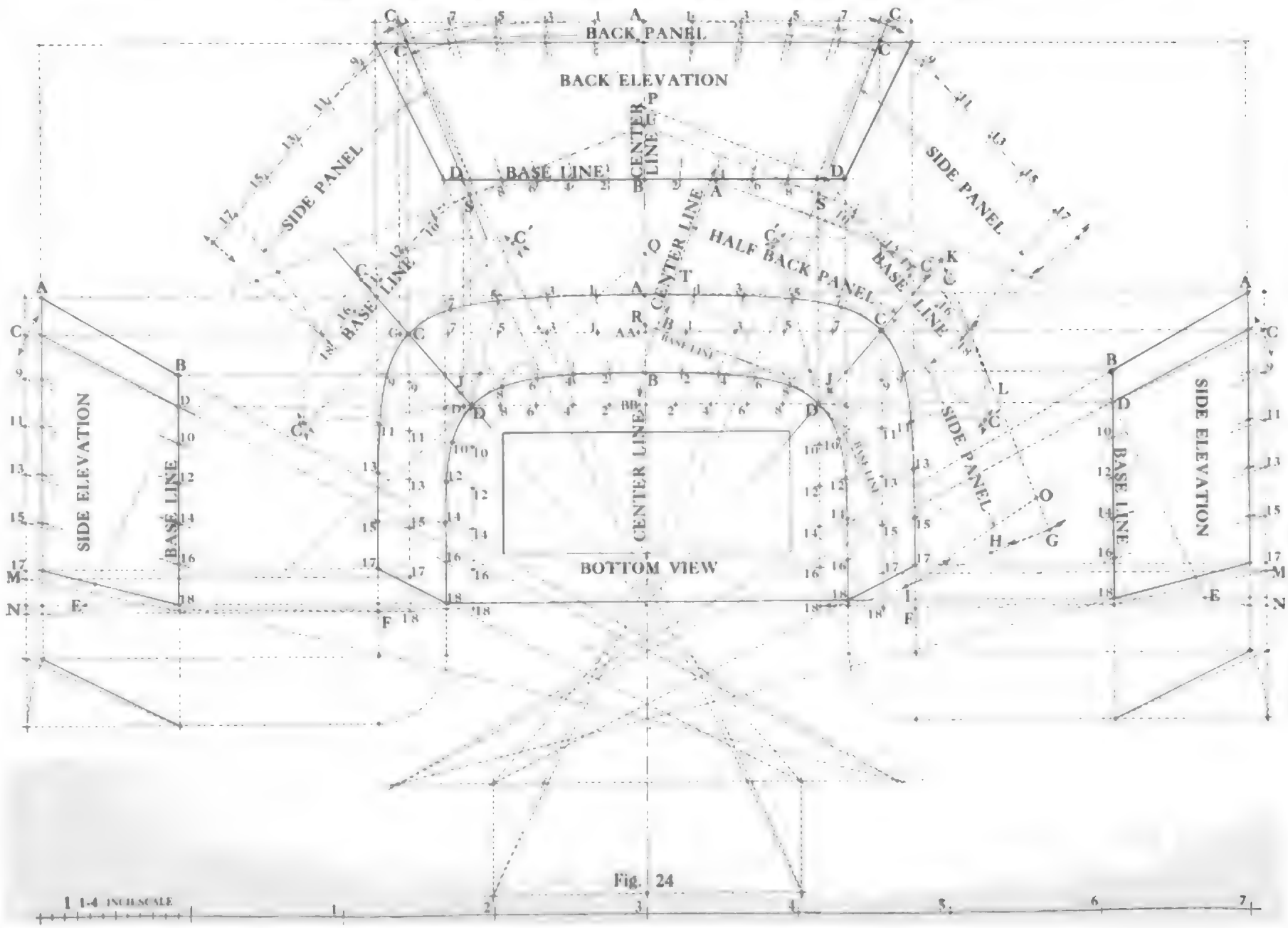


Fig. 24

The Vehicle Monthly Course in Drafting and Construction

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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Heergeist, Technical Editor and Draftsman of "The Vehicle Monthly."
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Subjects Treated in Previous Numbers

Part E—	Lesson	1	—Laying Out a Plain Board Seat	Part E—	Lesson	13	—Panels on Inclined Square Cornered Seats
"	—	"	2—Framing a Four-Cornered Seat	"	—	"	14—One-Piece Metal Seat Panels
"	—	"	3—Framing a Round-Cornered Seat	"	—	"	15—Shape of Panel Taken Direct from Bottom View
"	—	"	4—Laying Out and Framing a Two-Passenger Seat	"	—	"	16—Laying Out a Square Cornered Spindle Seat
"	—	"	5—Laying Out and Framing a Twin Seat	"	—	"	17—Seats with Straight and Inclined Surfaces
"	—	"	6—Constructing Round Cornered Seats with Strips and Boards	"	—	"	18—Round Cornered Seat Panel with Vertical Surfaces
"	—	"	7—Constructing Round Cornered Seats with Horizontal Joints	"	—	"	19—Obtaining Lengths, Heights and Curves by Triangulation
"	—	"	8—The Laying Out of Proportional Corner Curves	"	—	"	20—Obtaining Lengths, Heights and Curves by Triangulation
"	—	"	9—Establishing the Concave Surfaces of Seat	"	—	"	21—The Creation of Bottom Curve, Length of Spindles and Position of Rails on Bottom View, by Intersections
"	—	"	10—Length and Shapes of Concave-Convex Seat Strainers				
"	—	"	11—Length of Spindles on a Round Cornered Seat	"	—	"	22—Diagram of a Round Cornered Seat
"	—	"	12—Lengths of Seat, Spindles and Position of Rails	"	—	"	23—Obtaining Lengths, Widths and Shapes of Seat Panels

BACK NUMBERS CAN BE HAD FROM THE PUBLISHERS.

Part E——Lesson 24

Obtaining Curves of Seat Panels Direct From Bottom View

(For Working Draft see page 30)

Explanation. Fig. 24. This diagram is similar to Fig. 23, except different inclinations and curves; and the curves of seat panel are obtained direct from bottom view.

Take the five spaces on seat curve, bottom view, from point C to point A, and place them from point C to points A A, in a horizontal direction, on right side of diagram from center line.

Take the five spaces on seat curves, bottom view, from point D to point B, and place them from point D to point B B in a horizontal direction, on right side of diagram.

The above points represent the length of the back panel, top and bottom.

Take the five spaces on seat curve, bottom view, from point C to point 17, and place them from point C in a vertical direction to point 17.

Take the five spaces on seat curve, bottom view, from point D to point 18, and place them from point D in a vertical direction to point 18. These points represent the length, top and bottom edges of the side panel. The above four vertical lengths represent the lengthening of one-half of the seat panel, because the seat is curved and must be obtained by divisions, which should not be far apart. Put triangle on point D on base line to point C, side elevation, and draw dotted line to point E. Draw lines D C' D C', also curve C' C C', on bottom view, as explained on similar charts. From D to C', bottom view, is the width of the panel at the angle, or diagonal line, from D to C, bottom view. Set dividers on point C, the outside top curve of seat bottom view, and take length to point F. Put point of dividers of this length on point C and draw circular on G, right side of diagram. Put point of dividers on point D, and draw circular from point 18 and vertical line. Connect the two circulars, which is the length of side quarter, top and bottom edges, on the square line. Take space from point E to point 18, side elevation, and put it from point H to point I, bottom view; from point I connect with point J. Lines J, I and G must be square or at right angles. Take height on side elevation from base to dotted line, and put it from base line to L, bottom view, and draw line K, L and G parallel with points I J. Take space from M to N, side elevation, and put it from points G to O, bottom view. Connect point O with point I, which is the front edge of side panel.

For back panel set point of dividers on point D, bottom view, to points B B and draw circular; or take points B D, back elevation, which is the same length as D, B B, for bottom edge of panel. For top edge of panel set dividers from A to C, back panel, and from C to A make circular, bottom view; or take the length from point C to points A A, bottom view, as both have the same length. Connect circular B B, with circular A. Put triangle on line C D, back elevation, and draw line to point P and center line.

Take space between point B to point P, back elevation, and put it from point Q to point R, on center line; or take space from points B U, back elevation, and put it from point T to point B, bottom view, from point R to B connect with point J. Take height from point A to point B, back panel and center line, and put it from point B to point A, which is the center of back panel on bottom view. Connect point A with point K and give curve for panel, connecting with point C on top and point D on bottom.

The spaces from points D S, back panel, and spaces D J, bottom view, are always taken from intersections of D C' C' verticals and horizontals, on bottom view.

Problem. Fig. 24. Make another diagram, dispense with the upper panel and draw back elevation only; also draw the other half of the panel on the left side of diagram. Cut block, make paper pattern from same, and compare with the shapes of panels on diagram.

PART E—LESSON 25, WILL APPEAR IN THE JUNE NUMBER OF "THE VEHICLE MONTHLY."

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Motor Truck Body Types for Rural Express and the Farm

Bulletin No. 770, issued by the U. S. Department of Agriculture, has for its subject "Motor Transportation for Rural Districts." This bulletin is designed to furnish information to individuals, co-operative transportation societies and companies making a business of rural hauling. A great deal of carefully collected data regarding rural transportation problems is presented within the 32 pages of this pamphlet, covering costs, changes, collection and delivery, bookkeeping, terminals, bills of lading, etc. Many prospective rural truck operators and farmers will of course study this pamphlet, and will come to the truck manufacturer or body builder with fairly well defined ideas as to what sort of equipment they will require. So that the truck and body makers may be familiar in advance with the advice furnished by the government's experts, we reprint that portion of Bulletin No. 770 relating to the selection of motor trucks and bodies. Should you wish to read the entire pamphlet write for it to U. S. Department of Agriculture, Bureau of Markets, Washington, D. C.

Size of Truck

"The size of the truck to be purchased will, of course, depend very largely on the estimated tonnage to be hauled. Not only must the operator purchase trucks of sufficient size to care for the business at the outset, but he must plan for a normal increase in tonnage, so that at a later date he will not find it necessary to purchase other equipment more suited to his needs.

"It must be remembered that there is a very definite relationship between the size of the truck and its upkeep cost. The cost of operation per mile of a large truck is greater than is that of a small truck. If a large truck is purchased and the average load carried is well below the rated capacity of the truck, the operator will find that his cost per unit of load is high.

"On the other hand, where regular loads are uniformly heavy, the cost per unit of load is much less with the larger truck. One five-ton truck will transport a five-ton load much more economically than will two trucks of half that capacity.

"In some cases, consideration must be given to the character of the load to be hauled. If the load is perishable by nature and the truck is not loaded to capacity, the comparatively heavy springs of the larger trucks may cause a deterioration of the load.

"If the load promises to vary considerably during different periods of the year, it may be advisable to consider the use of a trailer in connection with a truck of smaller rated capacity than the maximum load. The trailer seems to have been successfully used by a large number of commercial operators, but the Bureau of Markets has no data regarding the advisability of using trailers when the load is uniformly greater than the rated capacity of the truck.

"Road conditions bear a direct relation to the size of truck to be selected. Roads having a light surface or country roads having a soft surface may not permit the operation of heavy trucks. In some States bridges in rural districts have not been designed to care for heavy modern traffic, and in these districts it is necessary to use lighter vehicles. Some States and some municipalities have placed legal restrictions on the weight of rolling vehicles passing over the roads. In most cases these restrictions are so worded as practically to forbid the use of trucks whose gross tonnage when loaded exceeds a certain maximum. In other cases the load which trucks may carry depends upon the width of the tire equipment.

"The prospective operator should communicate with the Public Service Commission or such other body as may have jurisdiction over the operation of trucks in his territory and inform himself in advance as to legal restrictions covering the operation of trucks on the highways.

Body Equipment

"The selection of body equipment must be based primarily upon the general character of the loads to be hauled. In rare cases where the goods are highly perishable or must be carefully protected from weather conditions, it may be necessary to use specially constructed bodies. Under ordinary conditions, however, the operator usually has his choice of several types, and his selection, as a rule, is based upon his requirements and the initial cost of the equipment.

"Body equipment is usually secured from one of three sources. Bodies may be built locally, according to the ideas of the operator, and super-imposed on the chassis when delivered; or, bodies of regulation design may be furnished by the manufacturer of the chassis as regular or special equipment. Some concerns specialize in building truck bodies according to regular or special designs and will furnish a body of any design submitted by the purchaser.

"Certain basic considerations are necessary in the selection of body equipment. The prospective operator should have a fairly clear idea of the general nature of the commodities which he will be obliged to haul. He should estimate the bulk of his load as compared to its weight. If any appreciable proportion of the ordinary load is perishable, necessitating special protection from heat, cold, or rain, consideration should be given to this fact in the selection of a truck body. If the average load is to be composed of package freight, the truck body will be much different from the one used if regular loads are composed of commodities shipped in bulk.

"Of the large number of body types, many are entirely unsuited to the needs of the ordinary operator of a rural motor freight route. However, attention may be directed to a few of the more common types of bodies. While no uniform names have been applied to these general types, it is believed that the descriptions given herein will be sufficiently plain. The following are among the commonest types of truck bodies in use:

"*Stake body (open top).*—This is a relatively cheap body, is easy to load, and is capable of carrying extra large loads of bulky goods. Because of its construction, it is adapted to a large variety of uses. It should be remembered, however, that because of the open top and the lack of protection on the sides, it offers little protection from the weather unless the load is well covered with canvas. It is not always easy to protect the load by means of a loose canvas cover, and for this reason, the open-top stake body is not as popular for rural hauling as is the next type mentioned.

"*Six or eight-post open-side body.*—This body has a permanent water-proof top and, with the use of the customary side curtains, is a very popular and adaptable type. It is comparatively light in weight and offers much better protection to the load than does the open-top body. In winter, however, it is not easy to heat where it is necessary to protect a perishable load. This type of body is the most popular because of its light weight, general adaptability and cheapness.

"*Straight-side closed body (or van body).*—This type offers the best possible protection to the load if it is so designed as to insure proper ventilation. It is possible to seal such bodies so as to protect the load from pilferage, this being a decided advantage where the load is a valuable one. The closed body is heavy, thus increasing the cost of truck operation and is initially expensive. It is not so easily loaded as the open-top, but may be used for hauling almost anything that is offered.

"*Open express body.*—This body resembles the ordinary farm wagon, has no stakes at the sides, and is uncovered. It is well adapted for hauling milk or products shipped in bulk, such as grain. It is fairly cheap in price, but offers little or no protection from the weather. It is not adapted for hauling large loads of light bulky goods, and except for special purposes, should not be selected by the average operator.

"*Dump body.*—This is an unusual type for rural hauling and is not adapted to a wide range of uses. It is heavy, unsatisfactory, and expensive for general rural hauling. It might be used advantageously for handling bulk grain or similar products, but should be selected only for special uses.

"In general, the selection of body equipment is a problem which solves itself if proper forethought is given to the character of the business. There are many special variations from the general types of body mentioned above. If the prospective load promises to be heavy in proportion to its volume, the body need not be large. If, as is usual with miscellaneous farm loads, bulky loads may be carried, it is important that the body be of sufficient size to accommodate a capacity load for the truck."

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Painting and Finishing

Painting a Paneled Top Delivery Truck

By M. C. Hillick

There are various types of these trucks or cars, some of the tops coming to the painter in one big, solid panel, and others being cut into several panels, but all large enough in length and breadth to give the painter a breathless half hour of varnishing, providing the temperature fails a little of being just correctly adjusted to 70 or 75 degrees.

This class of cars, when they do commence to decline and fracture and decay and flake and peel somewhat, are sure to furnish the painter a good-sized job of repainting. When such work is badly enough shattered to require cleaning off to the bare wood or metal, either the torch or varnish remover must be called into use; if wood, it may be that the torch will answer the purpose better, all things considered, than the liquid or paste paint and varnish remover. For the metal, however, the paint and varnish remover will furnish the quickest results, and will do the work so clean and nice that you may marvel at the effectiveness of the medium.

Advantages of the Burning Torch

It may happen of course that the insurance regulations will not permit the use of the burning torch, but in all candor, when these limitations are not in force, the old paint from the wood panels may be taken off with the torch quicker, and, we believe, cheaper than with the paste or liquid remover. Nevertheless, when these big, rangey surfaces become shattered to their foundations, and the old finish reaches a stage of more or less decay, the only feasible method is to take off the finish in a clean and certain way.

If a wood surface, sandpaper thoroughly until all the singed particles of fiber are knocked down and brought off under the sandpaper. Any charred bits of wood will need to come off clean and fine to the end that a live, virile foundation is furnished for the new material.

For the primer, use a pure raw linseed oil to the extent of three parts, and turpentine two parts. Add enough pigment to give the mixture a bit of body and coloring matter. Apply freely and brush out clean and with all ends caught up. For the next coat use equal parts of oil and turpentine with more pigment than in the first coat; brush carefully out to a smooth flow of material. On this coat when cured well, putty all defects, using a hard-drying pigment.

For the metal surface, after the removal of the old finish, and a careful and clean smoothing off, apply a priming coat consisting of one part of raw linseed oil and one part turpentine and use enough pigment to give a plentiful body of material when brushed into place on the surface; but avoid brush marks or any suggestion of brushiness. The second coat, applied in due course, will require about one part oil to two or three parts turpentine, local conditions governing this somewhat.

Metal Surface Absorbs Less Oil

It will be borne in mind that the metal surface will not absorb nor take care of the same quantity of oil that the wood surface will most easily do. Practically all the oil needed for the metal surface is just enough to securely bind the coat to the surface, meanwhile retaining in its composition sufficient elastic medium to feed and render aid to the coats coming later into position. Upon the second coat on the metal surface, as upon the wood, the puttying should be done wherever needed.

From this point to the finish the two types of surface may be handled in the same manner. Therefore we shall treat them as one in the directions following. In the application of roughstuff we should use the first coat by brushing it out with horizontal strokes; the second coat to be brushed out with vertical strokes, and *vice versa*. In the coating up of large panels this method will be found to fill out and make a closer knit fabric of material—finer, more compact and denser.

Anywhere from six to seven coats of stuff will be needed to fetch the surface up in a rounded form and capable of being rubbed so that the high spots and the hollows blend into a smooth and perfectly level field without rubbing through at any point and thus uncover a weak spot. Use in the application of the stuff a good round or oval bristle brush to the end that the coats may go on smooth and finished, a matter of great importance.

It will require skill of a high order to rub these big fields of pigment out correctly; we shall not stop to discuss this feature of work, taking it for granted that it will be carefully attended to by all readers of this article. Gouges and scratches of the surface will need to be avoided; they are mended with great difficulty on these great fields, and in many cases they cannot be concealed perfectly, and become an "eye sore."

In all this work it will be found a most important advantage to refine the primary processes as much as possible; it saves labor and material later on where these items cost more than at the earlier stage of the work.

After rubbing out allow the surface to dry out through the evaporation of the moisture; then run over it with No. 00 sandpaper to catch up any loose particles of pigment and to likewise polish somewhat the surface. This always insures better color results. Give the surface a most thorough dusting in order to start the color stage clean.

For these large surfaces the color had best be thinned a little more than usual as a means of avoiding brush marks and any furrowy symptoms. Use a brush suited in size to the extent of the panels; this will enable you to get over the surface quickly and before the color begins to set up in any least degree. Avoid cross brushing the color at the panel ends, for here may be laid a condition in color depth that may prove unsightly and discreditable. If there are any particles of color to be caught up, or any general slicking up to be done, use a small brush and simply take up the color with a sweep of the brush handled rather by the edge of the tool than by the full width.

The color should flow smoothly to its appointed place and flat out perfectly, and yet have body enough to hold its place compact and firm. Better to put two coats of the color on to get the desired covering properly than to make one coat do when it becomes necessary, in an attempt to accomplish this purpose, to unduly thicken up the pigment to a point that renders it unworkable to the extent of getting brushy and coarse in its particles. All roughness allowed in the color will surely become accentuated and exaggerated under the flow of varnish, for which reason particular care should be observed in handling this class of work.

The Finishing Coats

Above the color flow a coat of varnish-color to be followed by a coat of elastic rubbing varnish with a bit of color in it to insure the continued purity of color effects. We believe in the use of elastic rubbing varnish for these big fields of color as often as time limits will permit, because these surfaces are especially subject to vibration and oscillation and unusual surface strains, and an elastic varnish will respond more safely and readily to these surface movements than a less supple material will.

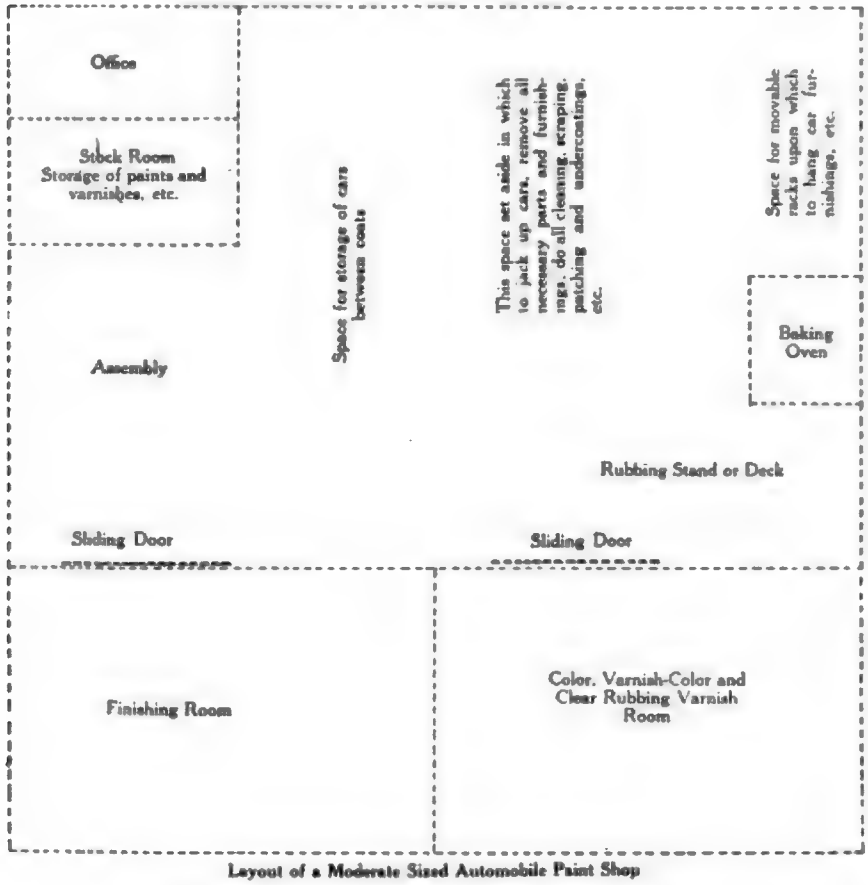
The rubbing should be followed, naturally, by an elastic finishing varnish. All coats of rubbing should be surfaced carefully and uniformly, and, above all, kept immaculately clean, if possible. This will save much rubbing and allow the maximum quantity of varnish to remain upon the surface where it belongs. In all these greater sized surfaces extra care must be observed in making the maximum quantity of material count for every atom of advantage it is capable of. Only in this way are we likely to get the full value of material investment.

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Lay-Out and Equipment of an Automobile Paint Shop

The lay-out of a moderate or medium-sized automobile paint shop should provide a floor furnished with a great volume of light, plenty of ventilation and sufficient heat at all times to enable the workmen to perform their work at their maximum productive capacity without neglecting to secure a uniformly high quality of results.

These considerations are most important and have largely to do with the success or failure of the enterprise. Hence in providing for the establishment of an up-to-date paint shop the above features deserve a first estimate, with the necessary apparatus installed to secure them. Adequate room space, heat, light and ventilation—these are the prime initial needs. Having provided for these, we now come to the lay-out proper.



Layout of a Moderate Sized Automobile Paint Shop

The Business Office

First—The office is an indispensable need. Give it light sufficient working space and a sense of coziness; the office worker deserves this. Chief records should consist of covering date car arrives, when delivered. Forms will need to be provided (or at any rate will greatly facilitate affairs in the office if so provided), which will show in Form No. 1, for example, who the car is received from, day, month, date, and year received, when to be released, etc.

Form No. 2 should carry the job number, class, hours applied, name of workman, date of work and application of material, etc.

Form No. 3 will show the hours of labor and the total amount and cost so applied to every car painted.

Form No. 4 provides for summarizing the amount of both labor and material applied to each job.

Form No. 5 records the quantity and kind of material applied to each job and the cost of same.

In an article by the present writer, published in THE VEHICLE MONTHLY, September, 1914, pages 62 and 63, entitled "Bookkeeping for the Vehicle Paint Shop," a complete exposition, including printed forms, as here alluded to, of making and permanently preserving labor and material records covering all work performed, is given.

Such forms will enable the painter to have accurate access to the cost, both of labor and material, of every job turned out of the shop. Such a record will give the owner the exact pulse beats of the business from day to day; show him the profit or loss on any given vehicle.

The office records should show a complete description and inventory of all the parts and furnishings carried by every car. A description of the entire car will also be of value; this should contain all defects, broken parts, etc., which attend the vehicle. Disputes and embarrassing situations, and sometimes much expense and annoyance may thus be avoided. As a matter of fact, the office can well be made, and should be made, the clearing house for business.

The Stock Room

Second—The stock room should be given an important place in the shop, with good light and ventilation, and desirable equipment. Here should be kept all paints, colors, varnishes, and supplies in general. Here, too, should be kept all brushes, dusters, wash leathers, pails, sponges, putty knives; in fact, all necessary tools.

Over this room should preside a thoroughly competent workman, experienced, and capable of mixing and matching colors, taking care of tools, etc. A poor stock keeper will upset the best laid plans of the management; will spoil and allow to go to waste an amazing quantity of material. An authority on these matters advises turning the containers of colors and other valuable paints over, or reversed end for end, once a week.

All supplies should be kept on shelves, well up from the floor; this applies to varnishes, especially. If the floor happens to be of concrete it will prove too cold for such sensitive materials. Indeed, the average floor without respect to composition, will prove altogether a bad place for the reception of any sort of material. The stock-room should be provided with a mixing bench, with a slab of marble at one end; with plenty of shelving above and handy to the bench. An enclosed brush-wiping board should be at hand. A scale will be needed to weigh all colors, paints, varnishes, etc. This to enable correct proportions to be had in mixing; guess work is always a wasteful method of doing this class of work.

Cleaning and Disassembling

Third—Reference to the lay-out plan (Fig. 1) will show where the car when it arrives at the shop should be placed for cleaning, disassembling, etc. Remove the necessary pieces, such as lamps, rear fenders, and, if possible, the front fenders; this will make it much easier and less expensive to clean. Jack the car up on horses provided with castors; this will make it easy to transfer to any desired part of the shop. If possible, leave the car on the truck upon which it is placed at the time of reception and disassembling.

From this first position remove the car in due time to the rubbing stand or deck, for washing, rubbing and cleaning up for the application of color. At the cleaning space the detached parts should be hung upon movable racks and thus transferred to their appointed storage quarters and adjacent to the baking oven, in case one is installed.

Fourth—In this room, through sliding doors, the car is next moved to where it receives the varnish-color and the clear rubbing

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varnish coats, so-called. In this room benches will be required in order that the workmen can reach the upper panels, roof, etc.

The Finishing Room

Fifth—Here we have the finishing room, also provided with a sliding door. Before being sent to this room, and after it has been removed from the varnish-color room, the upholstery furnishings should be carefully brushed or cleaned with the vacuum cleaning apparatus, and the car washed thoroughly throughout—made, in fact, ready for dusting finally.

The finishing room is the one almost sacred apartment to which no one but the men actually doing the work should be permitted access. It should likewise be devoid of all extra furnishings. Nothing to catch or retain dirt or dust should be allowed. A few boxes and benches will be needed and provided. From both the varnish-color and the finishing room lockers, brush-keepers, etc., should be excluded.

The Car Assembly Space

Sixth—This is the space set apart for assembling the car. Here all the parts come together and the final touches are applied.

General Remarks

In shops of considerable size—personally we believe of any size—the car from its initial position, described under head 3, is divided into three units, namely, the parts to be coated and enameled and baked, if an oven is installed; the accessories which require neither painting nor finishing; and the car proper. The accessories of course are hung upon movable racks and set apart until desired for final assembling on the car.

Baking Ovens

In the matter of the installation of a baking oven for at least the finish to be applied to the small parts of the car, there are two kinds quite generally used, to wit: the gas-heated oven and the electrically heated one. The electrically heated ovens cost more to install, but we believe not to operate, although we are not at this time able to speak with authority as to the latter. They are, however, much cleaner and easier to operate, and as a rule cleaner and finer results are obtained from their use.

In the cleaning of the chassis it is the practice where steam is available to employ a steam jet. This is pronounced a very effective method of removing the grease and hard accumulations. It eliminates a great deal of hard scraping and rubbing and relieves one of the trying and patience-taxing jobs connected with the car repainting business. Another plan just coming into practice is termed the parts-cleaning aspirator, a device working with an air pressure, aided by a jet of kerosene something on the order of a spraying machine of the older type.

In the absence of these devices the chassis may be cleaned by hand and made much lighter in real labor by the use of two parts turpentine and one part crude oil; or carbon tetrachloride, now about 15 cents a pound, diluted with an equal bulk of gasoline. These solvents should be freely applied to the parts at night and allowed to act until the following morning, at which time the real cleaning processes may be taken along.

Mixed solvents almost invariably work better and more effectively than when used alone. Common raw linseed oil mixed in the proportion of three parts oil and one part turpentine, applied to tar and greasy substances fast upon the body of the car, will be found a most effective solvent if left upon the surface over night, or, say, twenty-four hours. This is perfectly harmless to the finish, while the preceding solvents cannot perhaps be referred to in that way, and therefore should be employed only upon the underparts of the car.

Applying Lakes Over Old Paint

We have been asked to tell of a good method of painting scarlet lake over an old paint surface. We suppose our correspondent desires, although he doesn't say as much, to place the lake over some of the darker colors—perhaps black, or green, or blue, etc.

If the surface is in a good state of wear so that for the body a coat of ground color will suffice to make the basis for the lake, or, at most, two or three coats of the ground pigment, we should, after washing the job in a thorough manner, and allowing it to dry out, proceed to sandpaper the surface down exhaustively with, say, No. ½ sandpaper; possibly No. 1 paper will be none too coarse for the work. The workman must use his judgment as to this, for the reason that there is a wide variation in the coarseness of the paper, taking one size with another. The No. 1 paper of some manufacturers is no coarser than No. ½ paper sold by other manufacturers. It, therefore, is a matter of selection in large part for the painter right on the ground. What is needed is a paper that will grind the surface down solidly without furrowing too deeply into the finish, while at the same time roughing up the finish sufficiently to make a foothold for the after coatings.

Scarlet lake will need a ground color, preferably of vermilion, and it will therefore be in order to first lay on a coat of peach blow color. Make this of Indian red and white lead or any fine white marketed today; if the white is a japan ground material, it will be necessary to add, in breaking the pigment up, one part raw linseed oil to three or four parts of turpentine. This will give the ground a fair measure of elasticity and bind it securely in place.

Allow the coat to dry fully, and if any putty is needed put it on this coat, making a smooth job in order to reduce the labor of leveling to the minimum. Of course, if there is much facing up and stopping of cavities on this coat it will be essential to apply a second coat of the peach blow color. Follow this coat, when the ground is properly taken care of, with a coat of vermilion, japan ground and thinned for working with turpentine and rubbing varnish. It will not do to add oil to the vermilion; the oil kills the life of the vermilion and gives it a dirty red shade. The varnish, on the contrary, adds life and a binding medium to the color, and in addition gives the lake the benefit of this tough and well-fortified pigment.

For a first-class job of scarlet lake some of the lake should be broken up in turpentine, given a dash of oil to make it properly elastic, and with a flat, double thick camel's hair brush applied to the surface in the form form of flat coat. This will serve as an enrichment of the final coat of lake. This final coat will need to be made of the lake first broken up in turpentine to a cream paste, and then reduced to a varnish-color, or glaze, as it is variously called, and applied to the surface with a flat badger hair brush of a size suited to the size of the surface. For large panels, for example, a brush fully two and one-half inches wide will be found the most available and efficient tool to work with.

In applying the varnish-color flow the material on freely, or just as one would be expected to apply clear varnish; this will result in forming a full volume of material at each coat and will result in furnishing a deeper and finer luster and more of the real lake shimmer.

For the first coat of the varnish-color about two ounces of the lake should be used in a full pint of varnish, elastic rubbing being the favorite for this work. For the second coat of lake it will not be necessary to use as much of the pigment; one-half ounce will suffice to counteract the discoloring property of the varnish, and it will not retard the flowing properties of the material. If no ornamental work is to be applied to the surface the third coat of varnish had best carry enough color to keep the shade in rare good form; say a half ounce to a pint of varnish, as in the former coat. These coats will need to be rubbed with water and pumice stone flour very carefully, and washed up most thoroughly.

The final coat of rubbing varnish should have a careful and uniform reduction, with all parts of the surface given the same depth of varnish material as a further safeguard for the finish. The finishing varnish should be a high-grade, exceedingly pale, elastic varnish, and with this the surface should be flowed to the full extent that it will carry safely. In the lake treatment all the processes will need to be handled with great care and skill; each coat and process kept conspicuously clean, and all regarded as an important part in the finish.

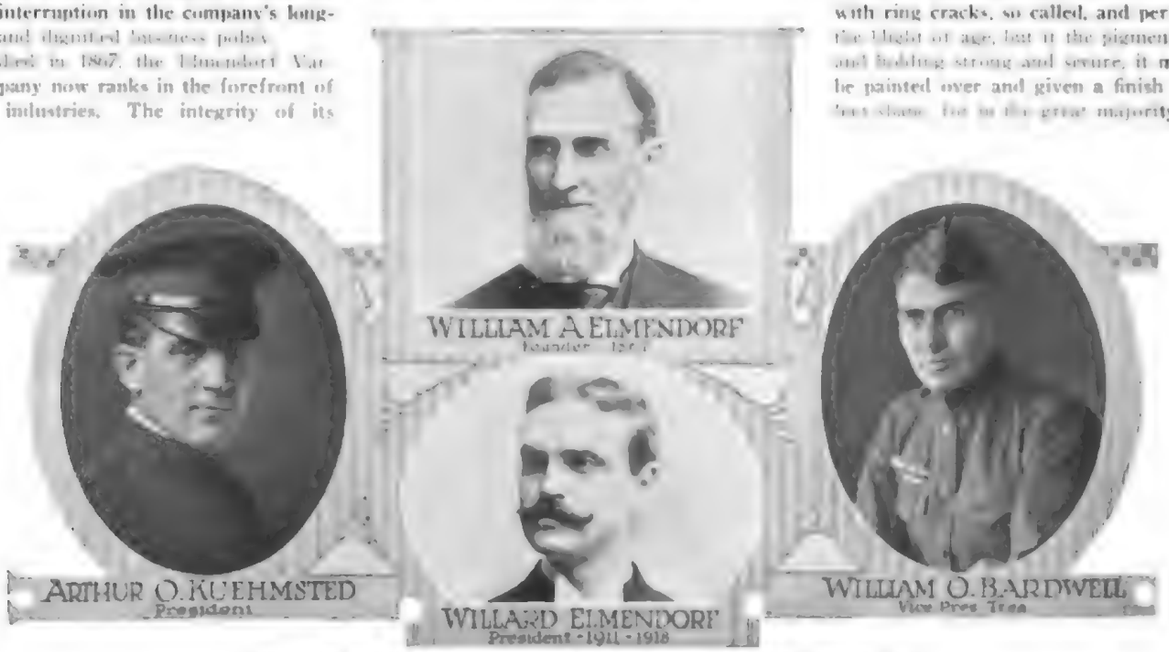
It will probably be necessary in painting over dark colors to apply two coats of the peach blow color, and in case the surface should be found in an uncommon state of wear and disruption it will likely call for some special form of treatment, including a coat of filling-up material with enough oil in its composition to weld it securely to the surface.

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Elmendorf Varnish Company Reorganizes

Of unusual interest, particularly to the users of high-grade varnishes, is the announcement of the reorganization of the Elmendorf Varnish Company and its incorporation under the same name it has been known to the varnish and paint trade for the past fifty-three years. The sudden and untimely death of Willard Elmendorf, last December, brought this about and, though the personnel in the management in this old and time-honored concern is changed, it does not mean an interruption in the company's long-standing and dignified business policy.

Established in 1867, the Elmendorf Varnish Company now ranks in the forefront of Western industries. The integrity of its



OFFICERS OF THE REORGANIZED ELMENDORF VARNISH COMPANY.

methods, supplemented by the steady improvement always bestowed upon its facilities, has made it a strong, vital force in the paint, oil and varnish market. Their general line of high-class varnishes, comprising clear and color rubbings, finishings, bakings, enamels, architecturals and japans, are well known to the carriage, automobile and truck building trade throughout the country.

William A. Elmendorf, the founder, was one of the pioneers of Chicago and a "Forty-niner," having joined in the historic rush across the continent to California in frontier days. On his return he engaged in various enterprises, and with two New York men placed the first sleeping cars on the Illinois Central Railroad in 1859. After a few years in the sleeping car business he sold out his interests to the Pullman Company and established the Elmendorf Varnish Company, serving as its head until his retirement in 1911, when his son Willard succeeded to its management and remained in active control until meeting with his fatal accident last winter.

Arthur O. Kuehmsted is president; William O. Bardwell, vice-president and treasurer, and F. A. Sterling, secretary. A. O. Kuehmsted and W. O. Bardwell are two young men of unusual business ability and experience, possessing initiative determination and push that make for success. F. A. Sterling is a tried and valued former employe, who has been with the old concern a great many years.

Mr. Kuehmsted is a graduate of the University of Wisconsin and a business man of sound principles, enjoying a wide acquaintance and fulfilling in every respect the high standard traditions of the house as they were exemplified by its founder, William A. Elmendorf. Soon after the country became involved in the war he was, up to the time of his enlistment in the Field Artillery, engaged in all manner of war work, serving as chairman on prominent committees on the Red Cross, Y. M. C. A., Liberty Loan bonds and Hoover pledge card campaigns. Resigning a responsible executive position, he joined the service of his country and was but recently discharged as first lieutenant in the Field Artillery.

Mr. Bardwell, a grandson of William A. Elmendorf and a nephew of Willard Elmendorf, has also for the past two years been in the service of his country and is the proud wearer of the "gold chevron" in recognition of his services with the marines on the battlefields of northern France and Flanders. He is a master of the technique of varnish making, having spent the first six years of his business life as an apprentice to his grandfather, who gave him a schooling in practical varnish making, such as few young men have the privilege of enjoying. Besides knowing the practical manufacturing end of the business, he has had considerable sales experience, having represented the concern on the road at the time his uncle acted as manager, and so is well known to the trade.

It is upon a career of such worth that the Elmendorf Varnish Company is based and it is extremely gratifying that a house which holds such an eminent position is to be continued along the same lines, notwithstanding the change in management.

Some Surfacing Details

In the repainting of trucks and delivery vans the need of going very thoroughly over the old fabric of paint cannot well be overestimated. There should be no painting over a foundation checked and flaky, with patches showing here and there. One cannot play with fire without getting his fingers burned, and by the same token you cannot undertake to paint over some of these old, flaky, peeling patches without first scraping and sandpapering all of this shelly mess entirely off.

The surface may be checked and infested with ring cracks, so called, and perhaps with the blight of age, but if the pigment is intact and holding strong and secure, it may safely be painted over and given a finish of excellent gloss, for in the great majority of cases the entire structure of paint and varnish will bear up splendidly and pay for the outlay.

On the other hand, if there is the peeling and shelly condition of the surface the only safeguard consists in scraping the loose pigment down close and sandpapering the surface beneath it until a perfectly sound base is secured. Then coat up with a mixture, for a metal surface, of good, sound iron oxide paint carrying a heavy percentage of raw linseed oil. In this manner all flaky places on the surface may be put in shape to hold out all the coats.

Many of these places will need filling with hard-drying putty; in fact, it will be found advisable to fill these cavities a little flush with the surrounding surface, and when the putty has dried well rub it down with either water and artificial rubbing brick or raw linseed oil and the brick. This will insure an exact level with the surrounding space without gouging out any of the filler.

To get the surface that is somewhat badly cracked into presentable shape with the minimum expense it will suffice to lay a thin coat of some reliable pigment made up with one or two parts of raw linseed oil and five or six parts turpentine. Over this coat, when dry, face up with a hard-drying putty thinned down with turpentine until it can be worked from the point of a broad scraping knife.

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Upholstery, Toppings and Mountings

The Art of Motor Car Trimming

It has been truly said that the automobile or carriage trimmer must "quilt like an upholsterer, stitch like a harness maker, and sew like a tailor." It is just as necessary that he should have good taste and a knowledge of design, proportion and color. The materials he uses are among the most costly of those employed in the factory and require great care in storage and in working, to avoid waste. So there is a great deal for the young automobile trimmer to learn before he can consider himself an expert.

Mr. Newcomb's series of articles, now running in "The Vehicle Monthly," are intended to cover the whole subject of automobile upholstering. He has taken up the art at the beginning, and as the series proceeds will impart to his readers many useful hints and helps, as valuable to most journeymen as to the average apprentice. The series will conclude with the selection of several typical cars, for which Mr. Newcomb will furnish complete trim instruction from the start to finish.

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Upholstery, Toppings, Mountings

The Art of Motor Car Trimming

A Series of Articles by an Experienced Trim Shop Superintendent, Designed to Assist Young Trimmers to a Knowledge of the Fundamentals of Motor Car Upholstery

By Joseph A. Newcomb

SEVENTH ARTICLE
(This series began November, 1918. Back numbers may be obtained from the publishers)

Touring Car Doors

As much room as possible is given on touring car doors for pocket space. Very often the entire body of the door constitutes the pocket. The door is lined with canvas or other suitable material by pasting and turning the goods over the strainers.

The outer covering is then tacked to the frame of the door and the outer door trimming is made in this manner, as in drawing: Double ply buckram is used as a foundation, the size of the opening of the pocket as provided for. The foundation is fitted to the door, marked around the outer edges, cut three-quarters of an inch smaller all around, thus avoiding any obstruction to the lace or molding finish.

The outer covering of cloth or leather is pasted smoothly around the pocket opening, turned for a hem one-quarter of one inch from the edge and is ready to be tacked in place. Two layers of cotton wadding are placed over the surface of the foundation and trimmed even with the buckram. The outer covering is then tacked smoothly in position. The flap is made on buckram, padded; outer covering hemmed and tacked in position.

The door is then ready for the welt or molding finish. If molding is used for a finish, a pattern is made the exact size of the door where the finish is required, and the molding is made from this pattern. The molding may be of nickel or brass finish, enameled black, or may be covered with the material used in trimming the job.

Front Seat Trimming—Plain Work

Plain trimming is much used at this time in closed car work.

This style of trimming permits of the use of a minimum amount of hair if executed in the following manner: We will take as an example the making of a plain top front cushion which has been used with much success. We have described the making of spring patterns and the making of springs, mentioning the gauges of wire, the pitch, and other essentials; so I will endeavor to explain only the making of a plain top cushion using a facing.

A piece of duck covering the spring, except the bottom, is used. Place temporarily in position, marking around the upper spring edge and the bottom of the cushion frame. Draw a line one and one-half inches in from the spring edge on the front and the sides; sew to this line a piece of muslin or light duck; replace in position over the frame; whip the goods fast around the spring edge; throw in a cotton roll from one to one and one-half inches in height, which is worked to the shape of a hard roll. The foundation material is then tacked to the wood frame of the cushion at the bottom, tacking along the face edges.

The covering and roll being in position, plaited in at the corners and trimmed off at the bottom, we stitch strings across the length of the cushion in three or four equal parts, the width of the cushion, under which the hair is strung smoothly. Any irregularities in the hair are then filled in and a muslin cover is stretched over the hair, upholsterers' pins being used in this operation.

After the pad is made smooth we can lightly quilt, in order to flatten or shape the surface. The outer edges of the muslin covering are stitched to the foundation at the sides by the use of a half-round needle. The pad being made, the leather is fitted with the



REAR SEAT OF CADILLAC BROUGHAM.
Striped patterns of Mohair Velvet are used on the seat cushions, backs and arm rests of this car. A solid tone on the sides and upper work makes a pleasing contrast.

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use of upholsterers' pins, marked around the spring edge or where the cord is intended to finish.

The cushion facing is arrived at by fitting a pattern around the sides, is marked for the cord finish, as intended, around the top spring edge and the bottom of the wood framing. A sufficient amount of goods is allowed to tack underneath as a finish. Three-eighths of one inch is allowed for the cord finish at the top. The facing is then fitted, with the cord attached to the facing.

The top proper and the cord are then score-marked, so as to permit the operating to be done as fitted. The leather is then detached and the facing operated to the top. The amount of material which has hung over in the fitting should not be trimmed off until the top and facing is again stretched into position. The surplus goods which have been left are then sewed by the use of a half round needle to the duck foundation around the sides, underneath the spring edge. This assures that the top covering will permanently hold to its position.

The facing is then drawn down and tacked underneath the wood frame, and I might mention here, lest it be overlooked, that air ventilation must be provided either by the use of grommets placed at the side and rear of the facing or in the bottom covering. A cushion made in this manner proves successful, allows the cushion spring to have its absolute freedom and the "full of its life" and permits a minimum amount of materials to be used.

Two pounds of hair would be the maximum amount required by making over the spring. Were the pad to be made on a frame, more material and more time would be required.

Making Front Back

In trimming a plain back over the springs, the following method proves effective: The spring is placed in position, covered with a layer of duck, tacked to the wood framing of the seat and at the top rail, stringing across. Under the strings is placed the hair. The hair is piled to the desired shape, an outer covering is placed over the hair, tacked to the seat frame at the bottom and at the top rail. A sufficient amount of goods is left on the ends to turn in, thus forming a pocket. The pad is then quilted through to avoid the shifting of hair.

The leather or other material is then tacked over the foundation, covered with a layer of cotton, tacked first to the seat board, drawn tightly to the top finish and turned in at the ends. This forms a well-constructed, comfortable back, with the use of a minimum amount of hair. The finish is accomplished by the use of lace or metal molding. This style of back is built at a less cost than a back made on a frame with a pad.

The finishing off of a job has a great deal to do with the impression created. A body may be exceptionally well trimmed, but if the laces, welts, etc., are not tightly drawn, smoothly laid and evenly tacked, the entire effect is lost. It, perhaps is one of the hardest operations in trimming a body, requiring the utmost patience and extreme neatness. It is undoubtedly a test for the ability of a trimmer.

Repair Work

Where an apprentice is connected with a custom shop or jobbing shop a wonderful opportunity for his development is afforded in repair work, where trimming must be removed and replaced, thus affording him an opportunity to acquaint himself with the materials used and being, so to speak, a preliminary education.

The removing of upholstery must be done with judgment and care. Tacks should be lifted and entirely removed from the cloth. The upholstery should never be pulled until the tacks have been lifted, and if no marks are visible for the position of the upholstery, guide lines should be placed thereon to insure the replacing of the upholstery in exactly the same position from which it is removed.

Tacks should never be left in the upholstery as removed, for the reason that they are very apt to pierce the cloth or scratch the leather, and if by accident they should be carelessly handled the goods may be ripped or some trimmer is likely to have a cut finger.

The handling of repair work by an apprentice acquaints him with the various parts and styles and different methods of doing the work, and gives him much food for thought.

The Menace of the Price Cutter

The present season has been a very busy and lucrative one for the custom repair shop. There has been a greater tendency this season on the part of owners of automobiles to have their cars repaired, repainted, new tops, etc., than any previous season. This condition has been created by the non-delivery and late deliveries of new cars. When business is plentiful there is always a tendency to increase the number of establishments able to take care of such work. This is due to the fact that the marginal price has been raised, due to demand. To be more definite, when work is plentiful the demand causes prices to raise so as to get service and attention.

The raising of prices therefore permits the entering the field of men with little equipment and small capital who can earn a living from the business, even with the lack of equipment, due to the high prices being paid.

Such shops become the so-called marginal shops. They exist only so long as the demand permits them to get a price which enables them to earn a living with their meager equipment and finances. They hurt the established custom shop because of the lack of business knowledge. They seldom know how to figure costs. Overhead is to them nothing but a dream, but as time passes it soon becomes their nightmare.

The "Mushroom" Trim Shop

Regarding these "mushroom" establishments, and even some of the older ones, I want to call attention to the vast differences in prices as met in competition on estimating. The human nature of Americans demands excitement of some character. Some get it by trying to drive a bargain. So it is when these people want to get a new top for their car or want their car repainted they huckster about town trying to drive a bargain and seeking the lowest price they can get. And they get quite a variation in prices. *Why?* Because of the lack of good, sound business logic and sense on the part of many owners of jobbing shops and due to the lack of knowledge of cost keeping.

Such shops will be greatly benefited and so will the entire trade be benefited as soon as the necessity of a uniform method of cost keeping for the automobile body trade is adopted and adhered to. By this I do not mean to suggest the regulation or control of prices. This takes care of itself when the manufacturer knows his costs.

These "mushroom" establishments, or so-called "gyp" shops, are a big hindrance and detriment to the better kind of mechanics. In such places usually the owner is a mechanic of some sort and very often works right at the bench. They slight their work and "skin" it everywhere possible in order to move it and get their money. They attempt to get along with green and cheap labor, endeavoring to teach them how to build a top, make slip covers, etc. Then when the rush season is over these "made-in-four-weeks" mechanics are out of a job and thrown on the market. They crowd their way into the better shops by working for a lower rate, thus lowering the standard rather than raising it.

There are Plenty of Good, Small Shops

I do not wish to be misunderstood when I speak of the small shops. The small shop which I condemn is that of the "mushroom" type, the fly-by-night "gyp" shops, which come and go with the busy season. My whole object in raising the question is to warn against price cutting and the lowering of the mechanical standard of the trade. There are, of course, many small shops, conducted on good business principles.

An electric cutting machine, while the first cost seems high, where much cutting is done, is an extremely cheap shop equipment. As many as twenty thicknesses can be cut with one operation. Simply mark your goods to your patterns and run the knife through in any shapes required.

* * *

It does not do a trim shop foreman any harm to make a study of equipment, cutting costs and increasing production and improving methods. An up-to-date trimmer studies other people's work and styles to advance his own method.

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Some Notes on Slip Covers

It is my purpose to treat of a job as received in a custom shop for top and slip covers, where first-class high-grade work is done. The method I propose to explain, both as to top and slip covers, is one which might be adapted to large scale production with the use of patterns.

In making patterns for slip covers for duplication, all parts must be fitted and basted. The sections, such as the backs, quarters, cushions or other parts, which must be shaped to the upholstering, must be basted on the job while being fitted. After the basting the goods is trimmed off, ½-inch allowance being made for the beading. A spring punch, using a No. 1 punch, is used to make guide holes for joining by the operator. After the shaped parts are fitted completely and accurately they are taken apart and from this fitting the patterns are made for duplication.

Use of Templates on Quantity Work

Generally upholstery work is so accurately made by the use of templates on standard jobs that slip lining is not only possible, but very easy. I will endeavor to explain the making of a slip lining in the most simple manner as made in a high-class custom shop and which method can be used for duplication.

Rough patterns should be cut for all separate sections for slip lining. The cutting of patterns for the cutting of the goods saves material. All parts should be cut at one time after rough patterns are secured. Cutting all goods at the one time saves much material and time.

The section at the rear of the back, say, for instance, the rear back, where the fasteners are placed for the back curtain and side curtains, which constitutes the center of the rear back and side quarters, should be fitted first. Leather is used as the top section over the quarters. The outside parts should be fitted and sewed together at the corners. That part of the top which constitutes the center part should be fitted and sewed together at the corners. These two sections are basted together and then the bottom part of the quarters and back is fitted and sewed together at the center part of the radius. This is then tacked in position and stretched tightly and basted to the two previous sections which have already been placed and basted into position.

Mark around the bottom, allowing an inch or so for tacking to the wood seat framing, where the parts are basted together. Trim off about five-sixteenths inch from the basting. A spring punch is used with a No. 1 punch, punching through in spaces close to the outer edge, as trimmed. This gives a guide line for the operator and eliminates the use of chalk. Chalk is often undesirable as an operator's guide from the fact that chalk marks are often hard to remove.

Most all slip linings today are welted, so in order to welt the work the stitches must be removed and the goods turned the opposite way that it has been basted. The outer edge of the rear back section is bound with manufacturer's binding, that is to say a binding prepared by manufacturers with one edge cemented and turned. This permits of a neat, flat binding with the outside stitching showing, and is rapidly done by an expert operator, and no basting or turning is required. The welting is five-eighths to three-quarters inch wide and is also furnished by manufacturers of welting in 100-yard rolls.

The front seat is fitted and finished in the same manner. The fasteners used are of various makes, but the acme fastener is easier attached and holds the lining closer to the job. First-class custom slip linings are usually attached by the means of these fasteners, and tacks are seldom used.

Doors and other flat parts are fitted to cover the upholstery, reinforced around the edges to give strength to the fasteners and finished with the flat binding.

It is well when beginning to make a job of slip lining work, especially where leather is the upholstery to be covered that the lines intended for the welting should be marked off on the job, with chalk, thus laying out your lines for basting in keeping with the shape of the job.

In fiting for the cushions, mark off with chalk on the cushion top where the beading is intended to be placed. Take the goods cut for the top and pin in place with the use of upholsterer's clamps. The lines intended for the beading should be placed far enough in from the outer edges that all the beading may show.

A slip lining for a cushion looks much neater with the welting all around the top rather than attempting the faceless front, and holds its shape much better. Where the cushion is nearly square the side facings are not required to be fit, but where the pitch was two inches or more the facing must be fitted to get a smooth job, otherwise with a square cushion, the size of the top piece being gotten out, a facing could be sewed around with the beading without fitting. But where the facing is fitted it is shaped to the cushion, basted to the top and sewed together.

The bottom of the cushion is marked off, folded over on the bottom at the front, mitered at the back corners underneath and hemmed as a bottom finish. Straps of the same material are made in three-fold, three-quarter inch in width, three straps across the cushion and skate buckles are used as a fastener.

For child's seats, the backs are usually fitted and made the same as a flat bag and closed with a flat binding, glove fasteners close in the bottom. The seat proper is usually mitered at the corners, turned over at the bottom and the bottom closed in with a flat square piece with glove fasteners. No studs are required for folding auxiliary seats in general.

The goods required for a seven-passenger job averages fifteen yards of fifty-inch material. Time required, first-class work, one man completing the job, forty-five hours.

Trimming Cape Top for Touring Car

Various methods are pursued in top building which are governed by shop conditions and output. Custom work tops are built on the job, but top work for duplication is oftimes built with the use of a "buck"; that is to say, a framework is built to represent the body irons and shape of back of job, also representing the windshield. But the use of a "buck" sometimes proves to be a failure unless they are made heavy and absolutely rigid.

The better method, where large output is concerned, is to use a model body with windshield attached and fasteners placed in the job, and the entire top can be completed. The boots are made from patterns and do not require a fitting for each individual job. After the bodies are trimmed the fasteners can be placed to fit the rear and side curtains by the use of templates.

There are various shapes of tops, the bows having different positions, different styles of back curtains, different shapes of quarters, but all are intended to harmonize with the job for which they are built. A wonderful selection of top materials is obtainable, each material having its particular virtue. Various patented methods for curtain arrangements and curtains to swing open with the doors by the means of removable rods are made. The most satisfactory curtains in use today is the last mentioned, and when made by an up-to-date trimmer suits the most critical.

Setting the Bows

In building a touring car top on custom work this manner is followed, but the same method can be used in obtaining measurements, patterns and amount of goods required. The top is first set, giving the proper "over hand" at the rear and the pitch of the bows, which on the ordinary touring top is five inches on the front and two and one-half to three inches on the rear.

Rows.—A piece of non-stretchable webbing is tacked on the front, second, third and rear bows to hold the top in shape. The pads are then stretched in position.

I might make reference to a little stunt that helps to keep the wrinkles and draws out of the pad. The back part of the pad is made wider than the front and a seam is stitched the length of the pad in the center. This helps wonderfully in making a smooth pad.

The pads being tacked in position, four lengths of non-stretchable webbing is stretched over the pad about four or five layers of cotton wadding tapered off at the edges and cut from over the bows and tapered over which the pad covering material is stretched. This is joined together by stitching.

In laying on the cotton padding each layer of cotton should be touched with paste. The strainers across the bows, if used, are stretched into position. The cutting of the materials should be done at the same time. That is, marking out on the goods of the different sections, and then cutting them.

The quarters are then fitted and should be stretched tightly and smoothly; the quarter line is marked out and the deck stretched

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over the quarters, turned under at the edges at the seam lines, and marked with chalk and checked for operating. Care should be taken that both the quarters and the deck are stretched in position with equal strain.

After the fitting the goods is removed and a reinforcement sewed along the bottom of the quarters, which is intended for the fasteners of the curtains, if they are required. A good finish for the quarters is of leather to match the goods, made as a flat binding. The back curtain is fitted and marked for the fasteners and curtain lights. A sufficient amount of goods should be left below the edge of the body to close tightly when placed in position.

Backstay strips are most reliable if made of harness leather to match the material, which are attached by means of footman loops on the bow and body with a buckle provided to take up the play.

The top and back curtain, then being operated, it is drawn and tacked into position. The quarters and back curtain being bound with leather, the finish for the front and back bows should be a cord made of the same leather as the binding and a metal-covered molding.

The side curtains should be finished with a leather binding. All side curtains should be reinforced around the edges. The windbrake beyond the windshield should be made of metal, covered with the same material and fitting closely to the windshield when in position. The amount of goods required is thirteen yards of 60-inch goods. Time required for custom work, one man doing the work completely, is about forty-five hours.

In making patterns for duplication, as each section is completed and found to be correct, it should be transferred to a pattern, that is to say strainer lengths can be obtained, pad sizes, curtains cut and bound, quarters cut and bound, back curtains cut and bound, lights placed in the same, all made up, laid away and ready for each top as soon as the bows are set up and the pads are built. The quarters and deck are bound and ready to be fitted and the deck seems joined together by the operators and are ready as soon as the back curtains are placed in position.

This method is used when tops are being built over sample bodies or "bucks." Bows, when they are required to be covered with leather are done in advance and ready for the particular job as it comes along. So by using this method top builders can be kept continually assembling without interruption.

Trim Shop Brevities

Poor labor is costly at any price.

* * *

Don't spend good labor on cheap materials.

* * *

Keep busy; time will pass quickly enough without you watching the clock.

* * *

It is extremely bad policy to imagine that the other man knows nothing. Ofttimes the fellow with little experience has some very good ideas. New ideas are often advanced and suggested by customers.

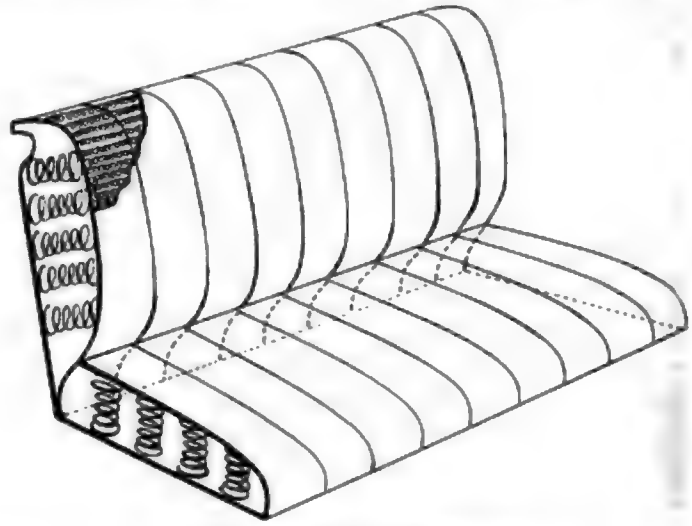
An Economical Spring Cushion

Motor car upholstery can be economically done through the use of properly made and arranged spring construction and manufactured cotton batts. The spring construction required is that of the lace web type made to the shape of the back required and the shape of the cushion required woven across with wire netting where the covering of upholstery comes in contact with the springs. Spirals of course are used and are held in position by wire supports. The spring is covered over with a light duck or burlap covering, over which is stretched the French plait style of work filled with cotton batts. If the spring construction is properly manufactured and properly shaped a satisfactory degree of comfort and durability is obtained.

In making a cushion of this type, the back would be made along the same lines. I would suggest the following method: The springs should be made the height and size required. The top covering of the spring should be of closely woven net work. The French plait style of work is made up in the usual manner.

A good, heavy thickness of cotton batt is pushed in the plait and is fitted over the spring and marked off at the back, the sides and the bottom of the frame. The spring is attached to a wood frame with staples. The goods at the bottom of the front is allowed to turn-under and is tacked to the wood frame. At the sides and back it is marked around the spring edge, to which the facing with cord attached is fitted and sewed to the top by machine.

The spring should be covered with a good, heavy layer of cotton, over which the top is stretched and attached to the wood framing at the bottom and finished off with either a covering of canvas or manufactured lace. Ventilation must not be overlooked at the bottom or the rear and side facings. This will complete an acceptable cushion for the cheaper grades of work without the use of hair.



AN ECONOMICAL SPRING CUSHION.
Economy is secured through the employment of woven wire over a spiral spring construction, with a liberal use of cotton batts.

New Door Fasteners for Commercial Bodies

A new fastener for rear doors of commercial bodies is being marketed by the Bremner & Terris Mfg. Co., 542 West Jackson Boulevard, Chicago. This device was originated and patented by Alex Christie, the well-known body builder of Seattle, Washington. Mr. Christie was unable to purchase a fastener that was as satisfactory as he thought a fastener should be, so decided to make one for his own work. His efforts were so successful that other body builders, seeing the advantages contained in the fastener, desired to obtain it for their bodies. A company was formed and the fastener was tested out for two years, during which time several changes were made in order to satisfy the most exacting body builder.

The fastener is known as the Christie Miracle Lock and consists of a hinged bar with handle, spring and catch. The spring and catch are applied to one door and the hinge to the opposite one, as shown in the cut. When the fastener is closed, the spring is pressed flat, fitting under and between the sides of the bar, which prevents doors from working up and down. Closing the fastener also exerts a direct pressure, equally distributed on both doors, eliminating all rattle or sag, and preventing doors from getting out of shape.

It is not necessary to change the present construction of doors to use this fastener. The advantages claimed are that it can be applied either right or left handed on single or double doors and either with or without binding strip. The catch is so made that when the fastener is closed a padlock can be used.

The handle and catch is made of malleable iron; hinge and bar of three-thirty-second-inch cold rolled steel and the spring is of high carbon spring steel, oil tempered and hardened to shape. The extreme simplicity of this fastener will appeal to the practical body builder.

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O'BANNON COATED FABRICS

MOLESKIN QUALITY

Ideal for Upholstery



While possessing the proper texture, weight and color varieties for finest closed car work, it also has the durability that recommends it for use on motor trucks and delivery cars.

Artful Applications of O'Bannon Products on next 2 pages



O'BANNON CORPORATION

200 Fifth Avenue

NEW YORK

O'BANNON FABRICS

O'BANNON COATED FABRICS

ARTFUL APPLICATIONS

Of Universal Application

The real value of leather substitutes lies in the fact that, in purpose, they are "real" substitutes. They may be used wherever leather can be used as an upholstering material, and answer every purpose that leather does, often having advantages over all kinds of leather.

The Proof of the Pudding

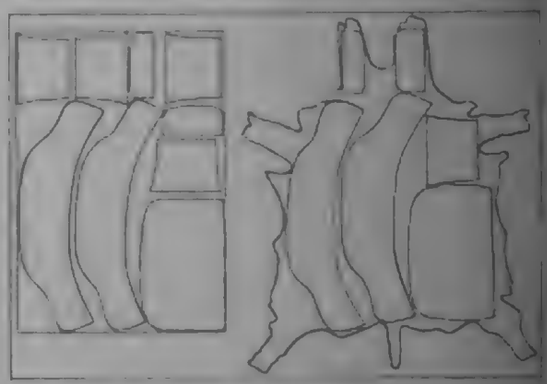
That coating which is applied to the cotton backing varies in substance, methods of application and number of coats. Each manufacturer of course claiming superiority for his product. However, "the proof of the pudding is in the eating," and experience teaches us best which leather substitute is best adapted to the work we have to do. Those who have tried them all and know say—O'BANNON.

The Pick of Beautiful Grains

The graining of leather substitutes has become a genuine art, and the grain as found on O'Bannon leather is perfectly natural, but far superior to the "ordinary" grain as seen on the regular run of hides. And for this reason—dozens of hides of real leather are inspected to find the finest and most perfect grain. This is then minutely copied in embossing the leather substitutes. It can, therefore, be readily seen why the grain is superior to the average run of hide leather.

No Waste in O'Bannon Leather

From the automobile and truck manufacturer's standpoint, O'Bannon leather substitutes are far more economical than leather **even if the cost per square foot were the same.** In other words, "it's all wool, a yard wide." You have real cutting surface—every inch of which is available. The standard width is 50 inches and



it is furnished in rolls of from 50 to 60 yards, whereas in leather the hides vary in size, have bad marks and some parts of the hides are not fit for good work—but in O'Bannon leather it is all alike, one piece as good as another.

Taken Point by Point

Taken point for point, O'Bannon leather is superior to all other upholstering materials with the exception of genuine grain hand-buff leather, which, due to its high cost per foot, the small amount of cutting surface and the excessive waste, makes it too expensive except for the highest priced but not necessarily the best cars.

O'BANNON COATED FABRICS

O'BANNON CORPORATION

OF O'BANNON PRODUCTS

O'BANNON COATED FABRICS

A Needle and Thread Pointer

When using leather or leather substitutes, care must be taken in sewing them. The diamond point needle works to very good advantage. The thread used in sewing must not be too fine and the number of stitches to the inch is according to the work being done. In other words, the stitch used in sewing the plaits of a French plait back should be different than that used for sewing in curtain lights.

How to Keep Upholstery in Prime Condition

The upholstering of an automobile is subjected to much harder use and strain than any other type of upholstery. Not alone must it stand wear, but it is subjected to bad weather, dirt, grease and extremely rough handling. Realizing this, the manufacturers of O'Bannon leather have put the same toughness of texture into substitutes for which grain leathers were noted and also to permit their cleansing in the same manner as leather.

A wash with lukewarm water and castile soap, then clean, warm water, drying and dressing with oil, renews the original appearance of either leather or substitutes and keeps them in good condition. Due to its many advantages over split leathers, and as an economical proposition, O'Bannon leather is used exclusively for upholstering a vast number of the best American automobiles.

Each Perfect of Its Kind

O'Bannon Coated Fabrics are made for the exact purpose for which it is intended to use them. For instance, one style is made for upholstering, another for Touring tops and another for Victoria and Landau tops. They are made in various colors, grains and finishes, so that one can always secure in the O'Bannon line a leather substitute or top covering of his choice.

When it comes to leather substitutes there is no ban on O'Bannon.

Looks Well, and is Pleasing to the Touch

Any style of upholstering which may be developed with grain leather can be duplicated with leather substitutes, making a fine appearance and affording equal comfort. Since the comfort of automobile upholstering lies mainly in the application of proper spring constructions and methods of doing the work, the surface covering does not affect it, except as to its working qualities and the softness of it, making it pleasing to the touch. This is featured in O'Bannon leather substitute and its softness is used as one of its talking points and selling features.

200 FIFTH AVE. NEW YORK

O'BANNON COATED FABRICS

O'BANNON COATED FABRICS

DUXRANE

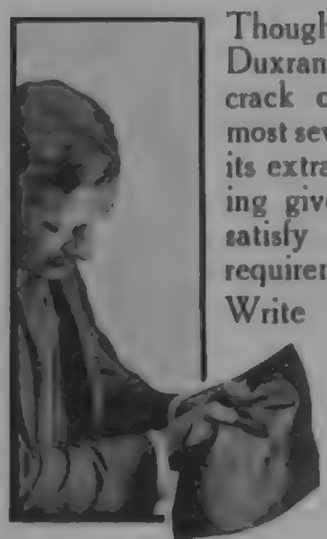
REG. U.S. PAT. OFF.

SINGLE TEXTURE TOP FABRIC

Give it the Scrub Test—

Take a piece of Duxrane in your hands and rub it severely — scrub it back and forth a number of times, just as a washwomen scrubs clothes.

Then examine it closely. You won't find a scratch or a crack—not the slightest mar on its surface.



Though it folds easily, Duxrane will not sag, crack or fade under the most severe conditions, and its extra high grade coating gives it a beauty to satisfy the most exacting requirements.

Write for a sample of Duxrane Top Fabric and give it the scrub test. It is a proof of superiority.

O'BANNON CORPORATION

200 Fifth Avenue, New York

Manufacturers of Leather Substitutes, Rubberized Top Fabrics and Enameled Goods

O'BANNON FABRICS

News in the Trade

Detroit Branch of Soss Mfg. Co.

The Soss Manufacturing Co., Brooklyn, N. Y., have placed Samuel Soss in charge of their Detroit branch. The tremendous growth of the business of this company has impressed upon them the fact that they must have direct representation in this field. Mr. Soss will make his headquarters at the Book Building, Washington Boulevard.

The experience of Samuel Soss in matters pertaining to manufacturing and production and his intimate knowledge of the problems that constantly crop up in connection with them, qualify him to co-operate closely and effectively with existing as well as prospective customers of the company.

The Soss Manufacturing Co. are confident that the appointment to this post of Mr. Soss, who has been connected with their plant and is thoroughly acquainted with the methods employed in the manufacture of their products, will put their customers in direct touch with their factory and insure an intimacy of relationship between them and their customers, which will add greatly to their mutual satisfaction and advantage.

Luverne Truck Parts

We know from actual experience that there are hundreds of shops throughout the United States that have the necessary equipment and help to enable them to build motor trucks and to convert passenger cars into motor trucks for the trade in their local territory on a basis which will furnish their customers with the maximum of truck value and service. They can do this at prices which will easily meet outside competition and enable the concern to become an actual motor truck factory with a permanent and profitable future.

To operate successfully and on a small investment it is necessary that these local truck factories have access to a supply of truck parts which they can get promptly and in small quantities as needed. The Luverne line of truck parts and truck unit parts is offered to the trade to meet this demand.

Luverne truck parts are furnished in several sizes suitable for trucks and truck units of from three-quarters to three tons capacity and consist of axles, wheels and tires, frames, fittings, springs, motors, transmissions, bodies, cabs, hoists, etc.

All parts are complete in themselves, ready to assemble and are sold either in complete sets or as separate units.

The Luverne line of parts is also well adapted for the export trade, for foreign firms who are in position to assemble the parts, and build bodies and equipment locally.

See announcement on page 52.

Motor Trucks as Railway Feeders

That the railroads of the future may find it more economical to tear up short line tracks and develop motor truck transportation in its place was the forecast made recently in an address on the future status of the railroads by C. A. Morse, assistant director of operation in charge of engineering and maintenance for the U. S. Railroad Administration. Mr. Morse delivered his paper before members of the New York Railroad Club and his remarks were followed with close attention as coming from one of the best known railroad men in the country. Mr. Morse's argument is that the perfection of the motor truck and tractor, together with the universal use of the automobile, has introduced a new element into the transportation problem that should be taken into consideration at this time, while studying the reorganization of the whole transportation question.



ECONOMY IN CAR LOADING AT GRAMM-BERNSTEIN FACTORY

The new method not only doubles the capacity of the freight car, but includes every means of transportation safety. Four trucks are now accommodated in the space formerly occupied by two. Two rest on the floor of the car, and themselves carry the other two. By means of careful blocking and cross support, quality is maintained and satisfactory delivery is insured.

Harland's Genuine English Varnishes

In spite of the war, William Harland & Son, varnish manufacturers, had over one hundred and fifty shipments of varnish from England during the period of hostilities. This varnish entered the United States through practically every port on the Atlantic coast, and three shipments came through the Panama Canal to Vancouver. Not one pint was lost through Hun submarines or from any other cause. This record is certainly a good advertisement for the efficiency of the American and British navies.

The English method of manufacturing varnish is entirely different from that employed in this country. The Wm. Harland & Son varnishes are probably best known of any English-made goods, and are standards of high-grade finishes throughout the world. They have been manufactured continuously for one hundred and twenty years. Branch houses of the company are established in the principal cities of Europe, South Africa, Australia, North and South America.

The Behlen Trailer

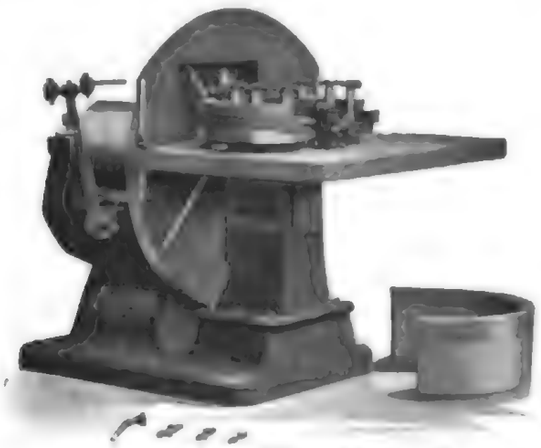
Charles Behlen, Cincinnati, Ohio, inventor of the Behlen trailer, has finished a new model trailer upon which the Charles Behlen Sons Company is about to begin production. The Behlen trailer tracks after the automobile or motor truck pulling it, and no attention need be given the trailer at all.

Parsons Mfg. Co., Detroit, have purchased a new factory building at Bellevue and Frederick Avenues, in Detroit, which they will soon occupy. Bigger business due to the popularity of their motor car specialties, necessitated more floor space, which the concern will secure in the building just acquired. It is said the purchase price is $50,000.

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Truck Rim Shaping Machine

The No. 807 motor truck rim outside shaping machine, as shown by the illustration, is a single purpose machine, and intended for shaping the outside surface of truck wheel rims after they have been shaped and sanded on the inside. This operation removes irregularities in the rim and reduces it to an even thickness, which is an important factor in obtaining wheels of good quality as well as a maximum output from the assembling operation. It will accommodate rims from one to four inches thick, of any width tread not exceeding 14½ inches, and of any inside rim diameter ranging from 24 to 40 inches. Unskilled labor can be employed to operate this machine, and a production capacity of 60 to 100 half rims per hour should be obtained.



TRUCK RIM SHAPING MACHINE.
Made by the Defiance Machine Works, Defiance, Ohio

The frame, of a shapely design, is cast of a close-grained grey iron. It is made in one piece with a cored center, and is of sufficient weight to absorb vibration when the machine is in operation. The base is made flaring, covering ample floor space to insure rigidity, and all parts are properly braced to maintain them in their original true alignment for a long period of use.

The cutter head spindle is made of high carbon steel, ground true, and rotates in long substantial genuine babbitt metal bearings, which are split to provide a means for taking up wear, and are fitted with gravity flow oil cups. It is 2¼ inches in diameter, and is driven through a pair of tight and loose pulleys. Each pulley is 14 inches in diameter by 6-inch face, with the loose pulleys fitted with sectional bronze bushings, and these pulleys are provided with a belt shifting apparatus, which is located within easy reach of the operator. Six hundred revolutions per minute is recommended as a proper speed for the spindle.

The cutter head, of a disc type, is 40 inches in diameter, and has a steel band shrunk over its rims, which construction allows the head to rotate at a high rate of speed with a large degree of safety. Four capped knives are fastened to the hand, and these are placed at an angle to effect a shearing cut, which eliminates any possibility of the knives tearing the stock; this result is obtained regardless of the depth of the cut being taken, or of any slivered condition of the surface of the rim. A guard is placed over the cutter head to prevent accidental injury to the operator.

The guide forms consist of three pairs of fan-shaped guides, which are pivoted in the middle of the arc. Only one pair of these guides are put in use at one time, therefore each pair is provided with separate tie posts and have adjustments independent of each other. They are mounted on a slide which supports an idle feed roll, and which has an adjustment to and from the cutter head to regulate the depth of the cut and the thickness of the shaped rim. This slide is mounted on a table with a planed surface, which supports the rim as it is fed around the form and to the shaping knives.

Horse power to drive, 6; electric motor required, 7½ H. P.; floor space occupied, 48 x 69 inches.

For further information write to The Defiance Machine Works, Defiance, Ohio.

Cincinnati Club's Annual Dinner

The April meeting and dinner of the Carriage Makers' Club was held on the evening of the 14th, at the Grand Hotel, with an attendance of sixty-six members and seven guests.

This meeting marked the thirty-third annual gathering of the Cincinnati Carriage Makers' Club, which is the oldest business organization in the State of Ohio.

The club was founded in 1886 and held its first meeting in February of that year in the Grand Hotel, hence the Grand Hotel was selected for the April, 1919, meeting.

H. H. Nelson, superintendent of Luth Carriage Co., was the oldest active member present, and he presided until the annual reports were read, as this meeting was installation night for the newly-elected officers.

Quite a number of reminiscences were brought up by members and the minutes of the first meeting of the club were read, all of which was very interesting.

B. S. Fallon, of the old firm of Fallon & Armstrong, and also Henry A. Harris, of the old firm of Anderson, Harris & Co., were invited guests and made pleasant talks. Both gentlemen were charter members of the Carriage Makers' Club.

The reports all indicated that the club is in excellent financial condition and is rapidly growing.

New Members Admitted

The following gentlemen were elected at this meeting to membership in the club: A. T. Jackson, of the Emerson-Brantingham Co., Rockford, Ill.; Harry Levison, of the Advertisers' Engraving Co., Cincinnati; A. E. Puls, of the Union Bow Co., Cleveland; Chas. B. Showell, of O'Bannon Corporation, New York City; J. Harry Fatthauer, of the Spokesman Printing Co., Cincinnati; C. B. Hopper, of the National Screw and Tack Co., Cincinnati; James R. Baker, of The Wheel, Top and Hardware Co., Cincinnati; W. B. Jones, of W. B. Jones & Co., Cincinnati; L. J. Danner, of The Leiding Insurance Agency, Cincinnati; A. W. Connor, of The Cincinnati Auto Specialty Co., Cincinnati.

Installation of Officers

The following officers were installed to serve the Carriage Makers' Club for the ensuing year: Clen Perrine, of the Brown Carriage Co., Cincinnati, president; Geo. W. Huston, of The Spokesman Publishing Co., Cincinnati, 1st vice-president; C. F. Renuekamp, of The Auto Vehicle Parts Co., Cincinnati, 2d vice-president; E. E. Hess, of the Sayers & Scovill Co., Cincinnati, treasurer; Joseph Wallenstein, manufacturers' agent, Cincinnati, secretary.

The newly-installed officers made splendid talks and assured the members they will do all they possibly can to further the interests of the club. As the membership is rapidly growing, there is every reason to believe that the Carriage Makers' Club will double its membership roll during the year.

The club adopted resolutions at this meeting unanimously supporting Mayor Galvin, of Cincinnati, in his stand in the firemen's strike.

The question of the annual club outing was taken up. This event usually takes place in June of each year, and as there seems to be various ideas as to the selection of the place, a motion was made to take a referendum vote of the entire membership.

Henry Rattermann, who is an honorary member of the club, was present and gave an eloquent talk. Mr. Rattermann's affiliation with the Carriage Makers' Club dates back many years.

The dinner, orchestra and the decorations were commended by all. P. P. Hunter, chairman of the entertainment committee, who had charge of the affair, did not overlook anything that tended toward the enjoyment of the party.

The automobile business is assuming very large proportions in Cincinnati, and in many cases the dealers are unable to fill orders promptly. There seems to be a demand for immediate deliveries in the auto line and the demand is for the higher priced car.

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Enos Goes With Firestone Steel Products

Lawrence W. Enos, until March a first lieutenant in the Quartermaster's Corps, is entering the organization of the Firestone Steel Products Company, of Akron, as manufacturers' representative in the Detroit district. His term of service with the Government was twenty months, during which time he had charge of production and truck inspection in various cities throughout the Middle West. His last assignment was in Cleveland, where his work involved the output of sixty plants.

Mr. Enos' last connection previous to his enlistment was with the Steel Products Company, Cleveland. His eight years' experience in the automobile industry has acquainted him thoroughly with its many phases.

Convention of Motor Truck Sales Managers' Association

The National Association of Motor Truck Sales Managers held its annual convention at the Bellevue-Stratford Hotel, Philadelphia, April 11th and 12th. Many papers were read and several addresses delivered at the four sessions held during the two days' meeting, and there was a trade banquet for members and their invited guests on Friday evening.

Big Demand for "Duxrane"

This spring is witnessing an unprecedented and tremendous demand for "Duxrane" top fabric. The O'Bannon Corporation's big plants are being run to capacity, not only on "Duxrane," but on the entire line of O'Bannon coated fabrics for automobile and truck upholstery and top coverings. Some of the largest automobile producers in the world use O'Bannon goods in quantities that would have been unthinkable only a few years ago. Every month sees new customers added to the long list of O'Bannon users.

Freight Route Body

(Continued from page 29)

be covered with some material, such as artificial leather, sheet iron or steel, or aluminum. Wood panels covered with artificial leather or cloth will not do well on account of contraction and expansion over such a large surface. Two or three-ply panels, covered with canvas over the top surface, may serve the purpose, but there is no canvas nor cloth large enough to cover such a top without joints, and there would be difficulty in applying it to the top. With all these difficulties, why not employ a composition panel board, which can be obtained in satisfactory widths, lengths and thicknesses. This material, while expensive, is not more so than sheet steel or aluminum, and costs less to apply to the body. This material does not shrink nor expand, which is the cause of most all other tops going to pieces, and does not "sound" or rumble from vibration.

Such a top covering needs only sandpapering after the nails have been driven below the top surface, primed and puttied.

Number of Pieces, Sizes and Kinds of Timber for a Freight Route Body with Cab

The Cab Body

No. of Pieces	Kinds of Timber	Thickness Inches	Width Inches	Length Ft. In.
2 Main sills	Oak	1⅜	6	3- 8
1 Center cross bar	"	1⅜	2⅜	4-
1 Read end cross bar	"	1⅜	2⅜	4-
2 Front corner pillars	Ash	1⅝	2⅝	5-
2 Center standing pillars	"	1⅝	1⅞	5-
2 Rear end corner pillars	"	1⅝	1⅞	5-
4 Door pillars	"	1⅝	1⅞	4-10
2 Side top rails	"	1½	8	4- 2
1 Front top rail, curved	"	1½	..	4- 7
1 Rear end top rail	"	1½	4	4- 7
4 Top curves	"	1	1	4- 7
30 Top strips	"	1	⅞	4- 3
2 Door top rails	"	⅞	2	1-11
2 Door fence rails	"	⅞	3	1-11
2 Door bottom rails	"	1⅜	3½	1-11
2 Side quarter fence rails	"	⅞	2	1-10
Glass frame timber	"	⅝	1¾	18-
Windshield timber	"	¼	..	20-
1 Seat board	"	⅞	19	4- 6
1 Front top glass frame rail	"	1⅝	⅞	4- 6
1 Front fence rail	"	⅞	7½	4- 6
2 Front upright pieces	"	⅞	7½	2-
2 Outside door panels	Poplar	⅛	23	2- 6
2 Outside side quarter panels	"	⅛	23	2- 6
1 Heel board	"	¼	15	4- 6
2 Bottom boards	Pine	⅞	18	4-
Top moldings	Ash	⅜	¾	25-

The Main Body

2 Main body sills	Oak	7⅜	6	10-
1 Front body cross bar	"	2¼	3½	5- 4
1 Rear body cross bar	"	2¼	6	6-
7 Inside body cross bars	"	7⅜	2⅜	5- 4
9 Bottom transom cross bars	Ash	1¼	4¾	6-
2 Frame risers	"	1¼	4¼	9-10
6 Bottom boards	Oak	⅞	11	9- 8

Posts and Rails

4 Corner posts	Oak	2⅝	2⅝	6-
4 Standing door posts	"	1⅝	2⅝	6-
8 Inside posts	"	1⅜	1¾	4-
12 Inside rails	"	1⅜	1¾	3- 9
2 Side top rails	"	1¾	7	10-
1 Front cross top rail	"	1¾	7	6-
4 Inside front cross rails	"	1¼	1⅝	6-
3 Inside posts	"	1¼	1⅝	6-

Drip Moldings

12 Upper side boards	Poplar	⅞	14½	3- 6
4 Lower side boards	"	⅞	24	3- 6
5 Cross front boards	"	⅞	14½	6-

Side Doors

6 Door posts	Ash	1¼	1⅝	3-
8 Door rails	"	1¼	1⅜	2- 8
4 Door boards	"	⅞	16	2- 8

Drop Gates

6 Drop gate posts	Ash	1⅜	1⅝	2-
4 Drop gate rails	"	1⅜	1⅝	2- 8
2 Drop gate boards	"	1¼	24	2- 8

Rear End Doors

6 Door posts	Ash	1⅜	1⅝	3- 9
8 Door rails	"	1⅜	1⅜	2-10
4 Door boards	"	1¼	18	3- 9

Rear End Tail Gate

5 Rear end tail gate posts	Ash	1⅜	1⅝	1-11
2 Rear end tail gate rails	"	1⅜	1⅝	5- 8
1 Rear end tail gate board	"	1¼	23	5- 8

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Half a Ton of Humanity—

A MOTOR-CAR manufacturer who knew what Haskelite had done in war time wanted to know whether we could build a Sedan top for his car.

We said we were willing to try; that we felt Haskelite would give the strength of metal combined with the lightness of wood.

We said this because exhaustive scientific experiment had proven that Haskelite was a workable wood material which was exceedingly strong and yet was adaptable to a wide variety of uses where wood, on account of the reinforcement necessary to give it strength, had never been satisfactorily used.

So from his dimensions we built him a top. But we wanted to show ourselves before we showed him. So, under the supervision of O. H. Basquin, Professor of Applied Mathematics at Northwestern University, we tested it.



Seven men, whose combined weight totalled 1006 pounds, standing on a Haskelite Ribless Top, 5-16 inch thick, of three-ply gumwood, bound together with Haskelite glue, and moulded under heat into a permanent shape

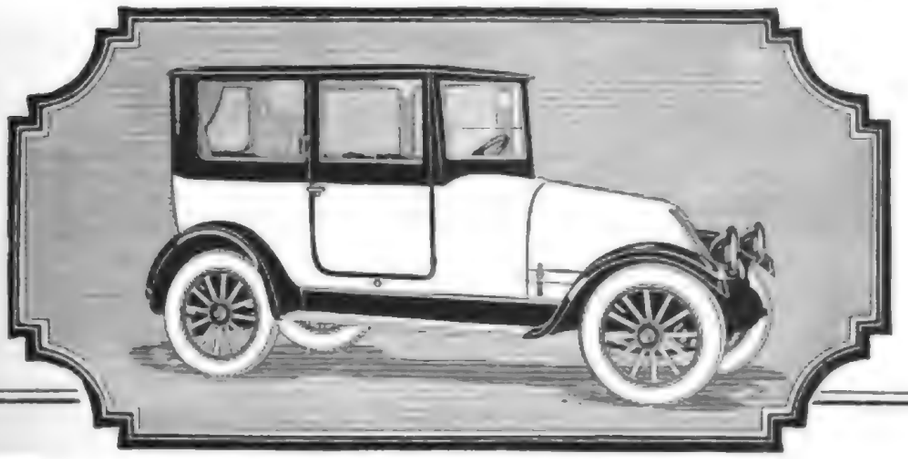
HASKELITE

The Waterproof

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on a 5/16 inch Haskelite Roof

These 1919 Models have a Haskelite roof



The experimental tests convinced the manufacturer. He has specified Haskelite tops on all 1919 Sedans. Each top weighs less than the material he had previously used, and is many times stronger, easier to build, and more durable

WHAT IS HASKELITE? A wartime discovery, manufactured in great quantity and under strict secrecy for the fuselages and pontoons of American and Allied airplanes.

It is a waterproof mouldable plywood, a built-up veneer, made of any wood specified, and bound with a glue which is absolutely impervious to heat and moisture. A world-famous automobile manufacturer boiled a sheet of Haskelite 292 hours and the plies refused to part.

It may be moulded under heat into a permanent shape. It is made in any thickness, from 1-16 to 2½ inches, in any number of plies from 3 up; and is furnished in sheets of any size up to 7 feet by 54 feet.

Haskelite is waiting to solve your special problems. Our laboratory, our volumes of special scientific reports and our representatives are at your service Address

THE HASKELITE MANUFACTURING CORPORATION
Chamber of Commerce Building, Chicago, Ill.
and 120 Broadway, New York

HASKELITE

Mouldable Plywood

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The Correct Welding Flame

(Continued from page 50)

the atmosphere at the outer blue part of the flame, where the temperature is sufficiently low to permit it. The result of this is that the inner or welding cone of the flame is protected by a shield of free hydrogen which prevents loss of heat and also tends to protect the weld from oxidization.

The temperature of the oxy-acetylene flame is approximately 6,300° Fahr., at the hottest part of the flame, which is the tip of the inner white cone. The effect of this tremendous heat at the point of treatment is to bring the metal very rapidly to a molten state so that it flows together and mixes thoroughly with the proper quantity of metal added by the operator.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

FREE LUMBER PURCHASE SERVICE.—We send Daily Bulletins to five hundred wholesalers and saw mills. You may list your inquiries for lumber free and receive competitive quotations from responsible concerns. The seller quotes you direct. LUMBERMENS BUREAU, Munsey Building, Washington, D. C.

AUTOMOBILE AND CARRIAGE body builders, body varnishers, varnish rubbers, finishers and trimmers. This company offers unusual opportunities for maximum wages and steady year-round employment under piece work and contract systems for skilled workmen with good experience on high-grade closed bodies. For further particulars address, stating experience, NEW HAVEN CARRIAGE COMPANY, New Haven, Conn.

BODY DRAFTSMAN required with experience on high-grade closed bodies. BLUE RIBBON BODY CO., Bridgeport, Conn.

FOR SALE. U. S. and Canadian patents on door lock for commercial bodies for sale or lease on royalty. Note letter or cause to manufacture. SAMUEL GEHRET, York, Pa.

WANTED. Body designer and layout man must be thoroughly competent in making full size drawings preparing patterns for body proving out interchangeability of body parts, so same will go together in production quantity at minimum piecework prices. For the right man it is an excellent opening in a progressive plant of one thousand bodies per month capacity, open and closed work. Give full information as to qualifications, references, salary expected in first letter. All communications positively confidential. Address "50" care THE VEHICLE MONTHLY, Philadelphia.

WANTED. A working foreman for trim shop must be an A1 man and quick workman, able to do all classes of cabinet work. Address "156" care THE VEHICLE MONTHLY, Philadelphia.

WANTED. A first class designer and body builder for high-class passenger bodies. Good opening for man of constitution ability who can demonstrate fitness. Located in Central West. Address "51" care THE VEHICLE MONTHLY, Philadelphia.

WOODWORKER.—A Canadian concern doing automobile body work is in need of a first class woodworker. Will pay best wages to a man who is not afraid of work. Address "100," care THE VEHICLE MONTHLY, Philadelphia.

ASSISTANT TO BODY ENGINEER.—Technical man wanted with practical knowledge of construction, manufacturing processes and materials. Apply, giving experience, reference and salary expected, "146," care THE VEHICLE MONTHLY, Philadelphia.

AUTO BODY TRIMMER FOREMAN WANTED.—We desire the services of a man thoroughly capable of supervising high-grade custom and production work. Splendid chance for the right man who can furnish first class references as to character and ability. State age, nationality, experience if married or single and salary expected in first letter. All applications held in strict confidence. THE RUBAY COMPANY, Cleveland, Ohio.

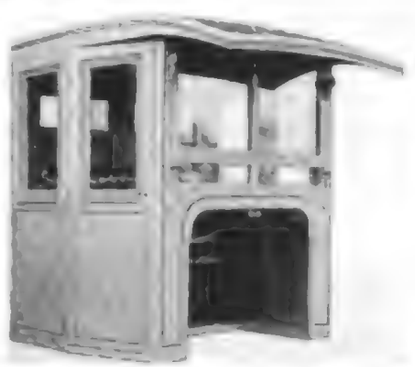
AUTO BODY ASSEMBLY FOREMAN WANTED.—Good opening for a man with extensive experience in fast and final assembling high-grade bodies, also production work. Applicants must furnish first-class references as to character and ability. State age, nationality, experience, if married or single and salary expected in first letter. All applications held in confidence. THE RUBAY COMPANY, Cleveland, Ohio.

AUTOMOBILE TRIMMER wanted. Have a position open for a first class trimmer and can offer good inducements. Steady work for an all-around man. Address "170," care THE VEHICLE MONTHLY, Philadelphia.

SUPERINTENDENT wanted for touring car body department of large body plant in Middle West. Must have experience in production of 150 bodies per day. Prefer man who thoroughly understands Ford. Address "155" care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—Three experienced body draftsmen. Address RACINE MFG. CO., Racine, Wis.

WANTED. Executive to superintend one of the finest automobile body repair and custom trimming and painting establishments in the country. Plant located at Detroit. Applicant must have thorough knowledge of painting, trimming and best, reconciling, have good references, and must be under forty. Salary $3,600 with a very substantial bonus. Address "90," care THE VEHICLE MONTHLY, Philadelphia.



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WITH DISAPPEARING WINDOWS
IN BACK, SIDES AND DOORS

Appeals to present and prospective truck owners. Makes an excellent seller as a dealer's side line and a strong talking point for motor truck manufacturers.

Notice the extension top which keeps wind shield clean during storms, also small wind shield opens *inward* throwing air on floor.

Write for detailed information

The Indiana Wagon Co.

We also build Commercial Combination Hog and Grain Bodies for any chassis

LAFAYETTE, IND.

BUILD MOTOR TRUCKS



We furnish all parts for making
MOTOR TRUCKS
and for converting passenger cars into Trucks

Send for Price List

LUVERNE AUTO CO., Luverne, Minn.

Reward of $100.00

for purpose of anticipating a patent, for first sufficient proof of use in the United States before 1906, or of an adequate description or illustration in a printed publication anywhere before 1906, of a door, preferably a vehicle door, having above it a screen, or any other flexible material such as canvas, fastened at one side beyond the door hinge and at the other side supported on a rod or similar **removable** part carried by the door opposite the hinge, so that the screen swings with the door and covers an opening above the door. Example shown, but structure need not be just like it. Further particulars furnished on application.



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Dumping Unit





APPEALS to cartage men and contractors everywhere. Allows use of full length bodies. Can be used on any make chassis. Eliminates use of wire rope, rope clips and sheaves. No portion of hoist higher than chassis seat. Does not interfere with ground clearance of chassis.

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Horizontal Hydraulic Hoist Co.
456 Book Building :: DETROIT, MICH.

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Brazing Compounds

IN THE GARAGE



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It is not necessary to dismantle the car—as the compound can be applied to the most inaccessible parts. All the necessary ingredients contained in one piece. Saves you 33⅓ Time, Fuel and Labor.

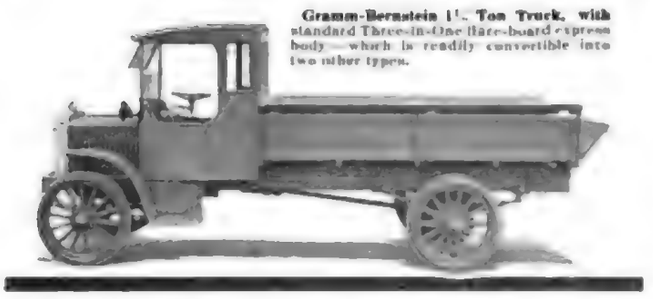
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Gramm-Bernstein 1½-Ton Truck, with standard Three-in-One flare-board express body—which is readily convertible into two other types.

The Extra-Value Truck Backed by a Good Name

The positive voucher for real extra-value in this 1½-ton Gramm-Bernstein, is the name of B. A. Gramm.

Truck-buyers know that name means 18 years of truck-building. They know what it has always stood for.

This truck is well-engineered and well-built. It is perfectly balanced, and uniformly strong and sound in all its units.

The rear axle is literally the truck foundation. The one B. A. Gramm puts under this vehicle is fit for 2-ton duty. Its bearing sizes, for example, are one to two points larger than in many 2-ton axles.

These Gramm-Bernstein springs might appear too heavy, or the leaves too many for the truck's capacity.

Mr. Gramm's experience tells him they are precisely right for a 1½-ton truck. He could use springs less costly than these of Vanadium alloy—but he will not risk a fine truck reputation of 18 years' standing.

By some, this 1½-ton transmission probably would be considered admirable for a 2½-ton truck. But Mr. Gramm knows the work to be done, and has built it for that work.

He does away with the "whip" of a one-piece propeller shaft by using a two-piece shaft. Three universal joints instead of two—better engineering and better results.

Both brakes work on the rear wheels, because Mr. Gramm has found that a propeller shaft brake causes excess wear on the rear transmission bearing. Again, the Gramm method is more costly—and better.

$1895

F. O. B. Lima, Ohio

1½-Ton Chassis with driver's seat.

$1975: 1½-Ton Chassis with all-weather cab, doors, curtains and windshield.

$2115: 1½-Ton Truck, complete as illustrated above, with flare-board express body, which is convertible into a slatted express body and a covered, slatted express body.

These are strong evidences of unusual value. Without these elements, the success of a truck is doubtful.

If further assurance of downright excess value were asked, we should say, "Dig into Gramm-Bernstein records for performance, for low-cost operation, for honest service."

We know this truck to be so much better—the Gramm-Bernstein record is so clean—that we feel the two factors must convince thoughtful business men and truck buyers.

A highly practical feature of the 1½-ton Gramm-Bernstein is its Three-in-One body, illustrated on this page.

Other body types are the platform stake and the slatted stake, each furnished in high, medium and low styles.

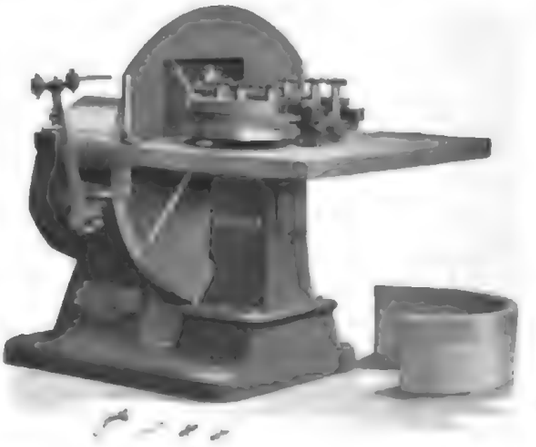
The Gramm-Bernstein line includes all practical capacities from 1½ to 5 tons—all chainless drive.

GRAMM BERNSTEIN

Lima Ohio, U.S.A.

Builders of the first standardized Liberty (U.S.A.) Truck

DEFIANCE



New Heavy Auto-Truck Rim Outside Shaping Machine

It shapes the outside of Auto-Truck Rims, of single or dual type, after the inside has been shaped and sanded. It removes the wind in the rim and reduces it to an even thickness.

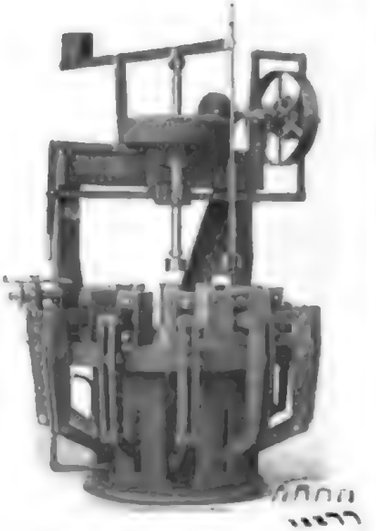
This operation is indispensible to the wheel manufacturer endeavoring to obtain a pefectly assembled wheel, and a maximum production from the assembling machine. It saves all the time lost in shimming irregularities in the rim during the assembling operation.

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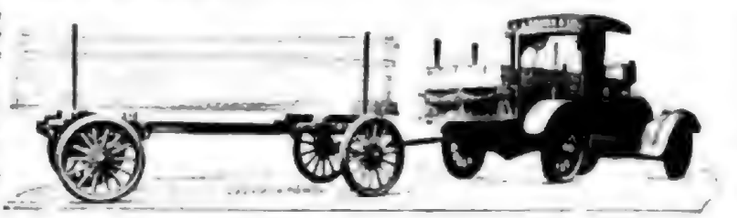
THERE is danger in having all your eggs in one basket—as recent conditions have shown. To wise dealers in automotive lines who are seeking a broader foundation for their business, more diversity in the products they sell, and a bigger market to sell in—we suggest the Trailmobile. It offers a profit margin equal to that on the most sought-for passenger cars and trucks. It can be sold to almost any truck owner, and to many passenger car owners who have hauling to do. It sells easily because it cuts hauling cost from 10% to 60%—and volumes of testimony prove it. Large companies buy Trailmobiles in quantity.

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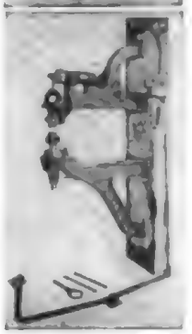
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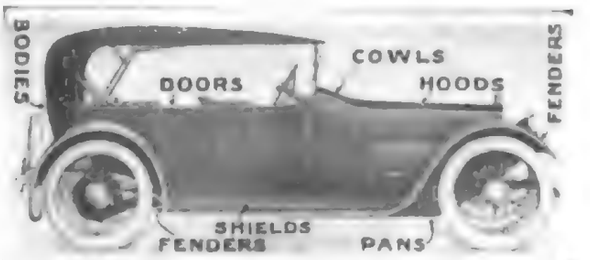
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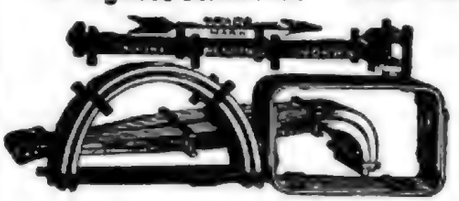
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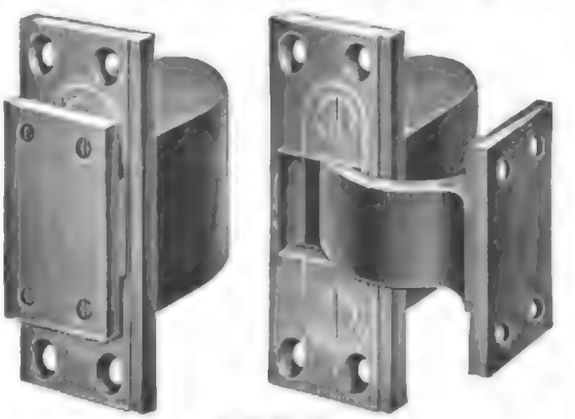


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About Concealed Hinges



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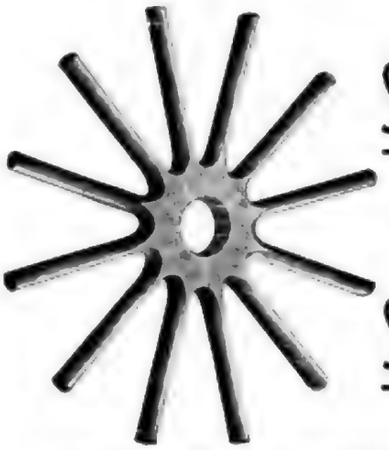
WE HAVE manufactured for years a Concealed Hinge with drop forged steel hook, and a drawn brass non-rusting case. One of our designs is shown in the accompanying illustration, and we desire to inform the trade that all Concealed Hinges we make are fully protected under U. S. Patents owned by us. We will protect all users of our Automobile Door Concealed Hinges, or for that matter on any other goods which we may manufacture and offer to the trade.

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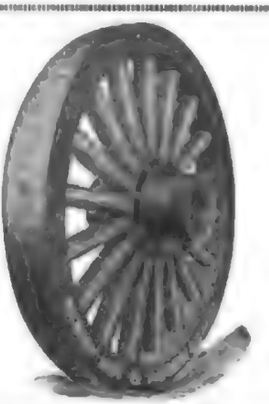
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Medium and Heavy Sarven with Tires.

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It has proven its worth in actual trailer service. Made for light, medium and heavy work.

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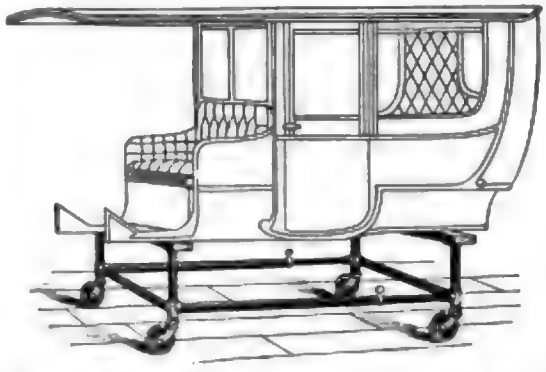


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Will add to your facilities in Handling Work in the Wood, Smith, Paint and Trim Shop.

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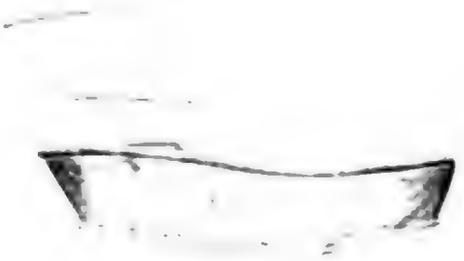
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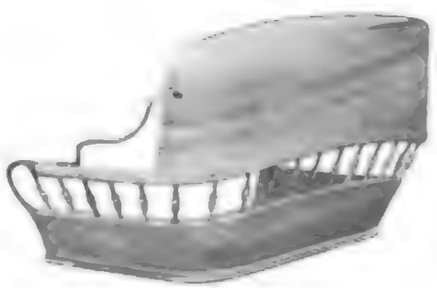
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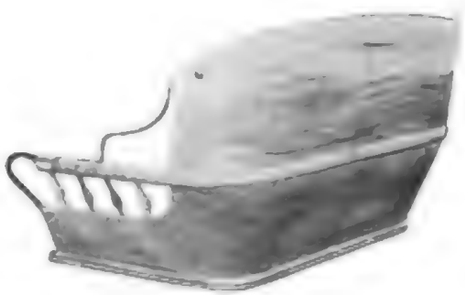
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Their patented steel and wood construction guarantees stronger, lighter trucks.

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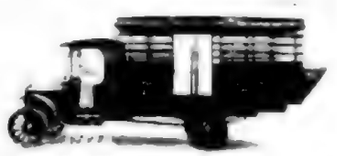
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Watertown - N. Y.



Hand Hoist for Ford Truck

(Patents Pending)

TAKES no room back of cab, is easy of operation, simple and neat in appearance.

Shipped on sub-frame, ready for mounting on chassis. Easiest for the body builder to install and best—because it always makes a satisfied customer.

Write for photos and blueprints.

Truck Engineering Company

7031 Broadway
CLEVELAND, OHIO

COLUMBIA WAGON CO.
COLUMBIA, PA.

WE have completed our contracts with the Government and are now back to normal conditions. We hope to hear from our trade. Our new price lists are ready to send out.

We have been doing our best to serve our customers, but, owing to our part in aiding Uncle Sam win the war, we could not always make deliveries when promised. However, you can count on us hereafter to furnish promptly the well known COLUMBIAN BODIES for motor trucks and our general line of wagon work.

Catalogs upon request

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OUR War Work will be done soon. Our designers are ready NOW to co-operate with you. Our factory is fully equipped with modern machinery and best mechanics. We build the highest grade Auto Bodies, in the white and complete. We have sufficient materials on hand for a large order, and our shipping facilities are the very best. :: :: :: ::

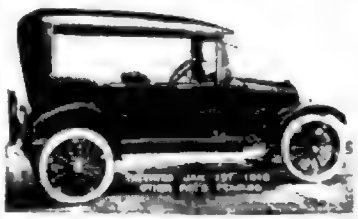
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We specialize on "Up to the Minute" truck bodies of all types. Ford truck and delivery bodies carried in stock.

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For Warm Weather

Secure the agency in your locality for

THE HUMMER ALL-YEAR TOP

(Manufactured under Allen Patents)

Lightest Closed Top on the Market

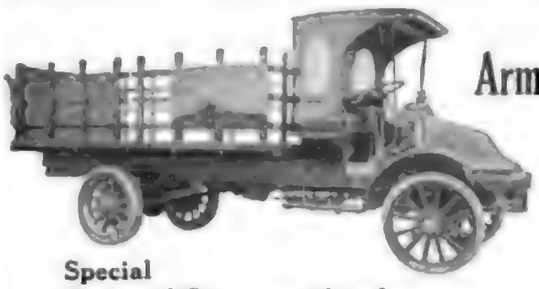
Hummer Vehicle Works
CHICAGO HEIGHTS ILLINOIS



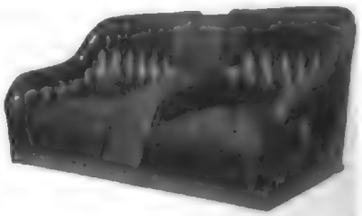
For Cold Weather

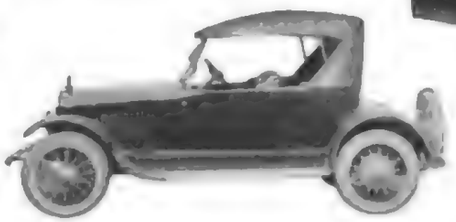
Auto Tops—Trailers—Ford Accessories—Horse-drawn Vehicles

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Special Designed Commercial and Pleasure Car Bodies

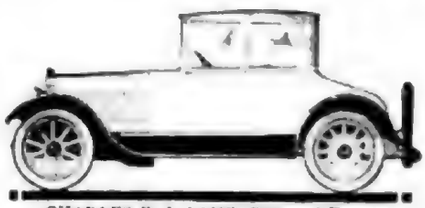
Send blue prints and specifications for estimates

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CAB TOPS

THE LANG BODY COMPANY

MANUFACTURERS OF

Automotive Bodies



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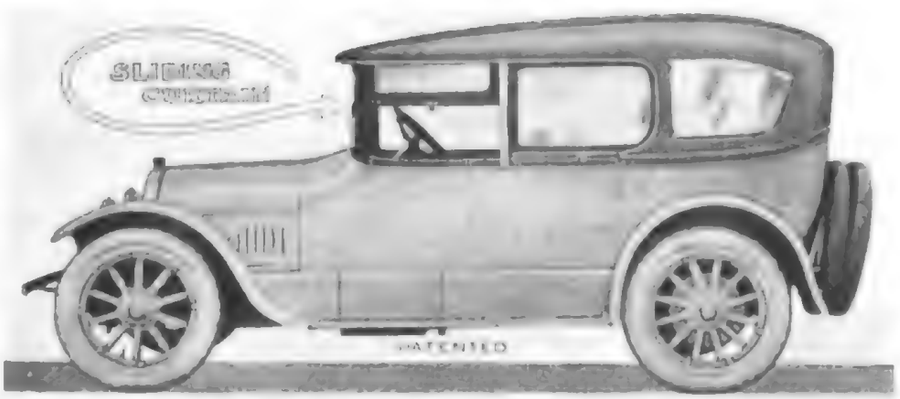
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ELMER J. LANG, Vice Pres. and Gen'l Mgr.

THE GILLIG TOP

That can be converted into a Sedan in two minutes without stopping car



The Latest Thing in Tops

THE GILLIG PATENT TOP with sliding curtains is a permanent TOP which may be attached to the body of any make of automobile, and can be converted from an open touring car to a closed car *by the simple operation of letting down the folding channel to its proper position* and pulling the curtains down. This arrangement, in two minutes' time, gives you two cars in one, either an open car without an obstruction or a closed car; either side may be opened or closed as you prefer.

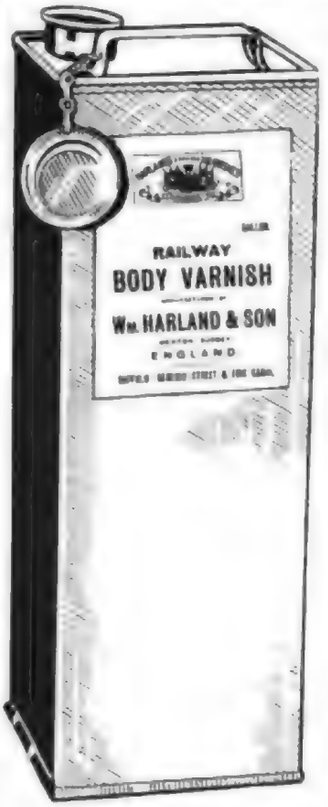
A GILLIG TOP not only adds greatly to the appearance of your car but gives all the comforts of a Sedan and does not add over a hundred pounds to the weight of the car. These tops are covered with the highest grade of material obtainable and can be had in various colors.

SHOP RIGHTS AND LICENSES UNDER THIS NEW PATENT, WILL BE MADE ON FAVORABLE TERMS TO RELIABLE SHOPS AND FACTORIES

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ESTABLISHED 1791

Varnishes, Enamels and Japans

All our Imported Varnish is contained in the long, hand-made cans, or in 12½ gallon iron drums, and every can and drum bears the blue and white Harland Seal. This is the genuine English Varnish, used today by most of the best Body Builders all over the world.

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A

TON TRUCK

for

$15

—Hard To Believe Isn't it, but

Columbia Ton-Spring Makes 1-Ton Truck for $15

YOU MAKE A GIANT OF YOUR FORD WITH A TON-SPRING

You ask—"What is Ton-Spring?" Ton-Spring Unit for Ford Cars is a simple cantilever bracket attached to the Ford housing and set on the Ford perch forming a support for a heavy coil spring which is attached to the sills of the body, and which carries the excessive loads. Thousands of Ton-Spring attachments are in use daily and all giving service and satisfaction to the owners. With this attachment the gasoline consumption is no more than an ordinary touring car, but your car is twice as efficient. Instead of making two trips you carry twice as much in on trip.

Time Is Money—Save Time—Thereby Money

Ton-Spring Unit *for* Ford Cars

A Real Ton Truck Attachment for Fords. Increases the carrying capacity 50%—stops side sway of body—saves tires by keeping body level at all times—put the load where it logically belongs, thereby saving rear axle trouble. With Ton-Spring you can use a 66 or 72 inch body on a regular Ford chassis. *And think of it! All for fifteen dollars. You cannot afford to be without one.* Anyone will gladly pay

$15.00

For what Ton-Spring will do



Anyone Can Attach in 2 Hour's Time

Ton-Spring can be used on any Ford chassis—new or old. Easy to attach—no holes to drill—no mechanics required, anyone can put it on in two hours. It is simplicity itself—a device of real mechanical merit. *It never a Grief of a Ford chassis.*

$15.00

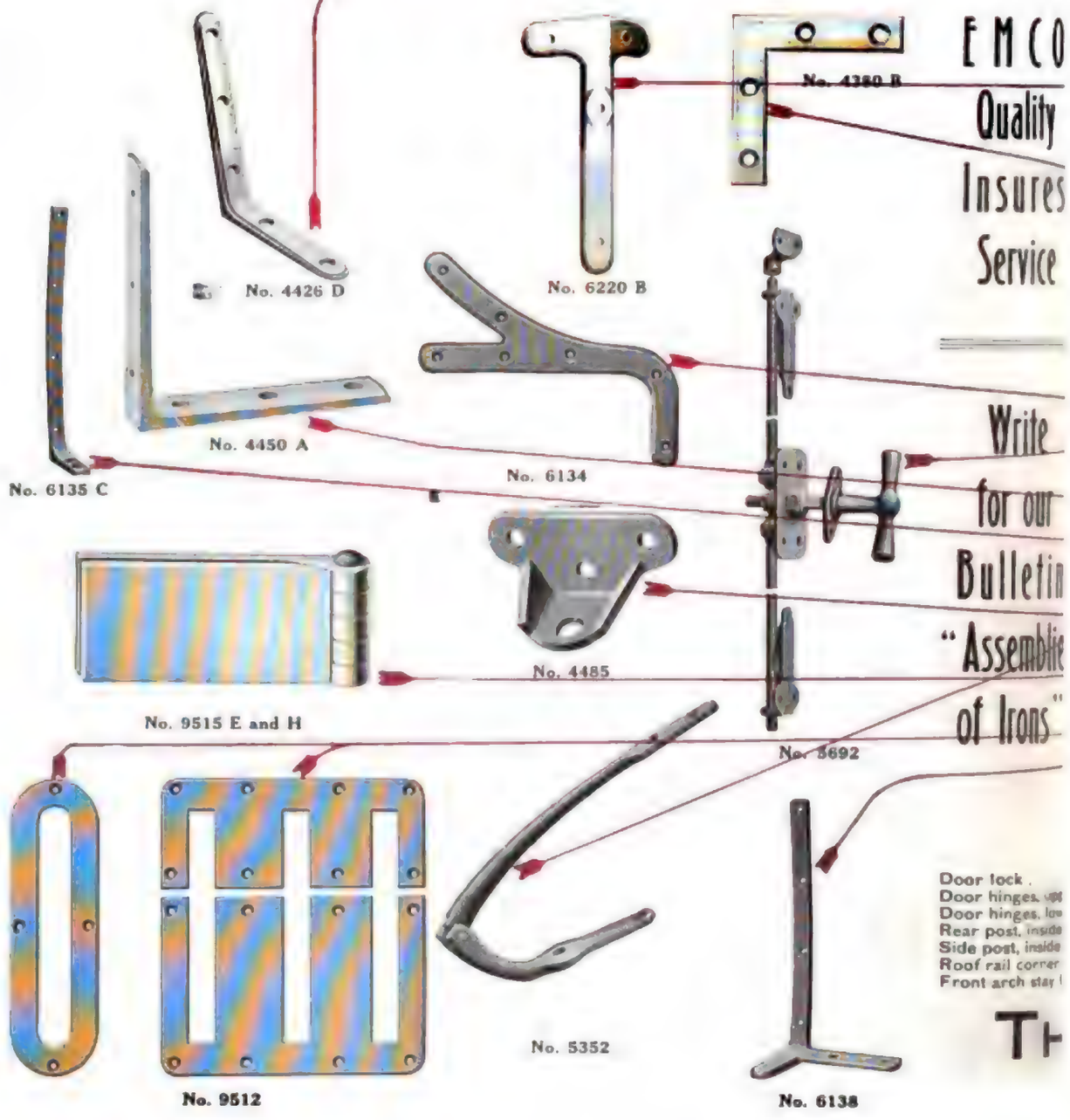
Saving on body and car alone is worth more than the price

TON-SPRING UNIT WILL SAVE THE MERCHANTS MILLIONS. We say Ton-Spring Unit for Ford cars will save the nation millions by increasing the carrying capacity and efficiency of a Ford chassis. All merchants now using the Ford cannot be without Ton-Spring at $15.00. It saves the price of a Ford car in increased hauling capacity alone, not saying anything about the tire wear caused by body side sway and the overhang of large commercial bodies now used. *It is worthy of a trial. For sale by all dealers.*

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Quality
Insures
Service

Write
for our
Bulletin
"Assemblie
of Irons"

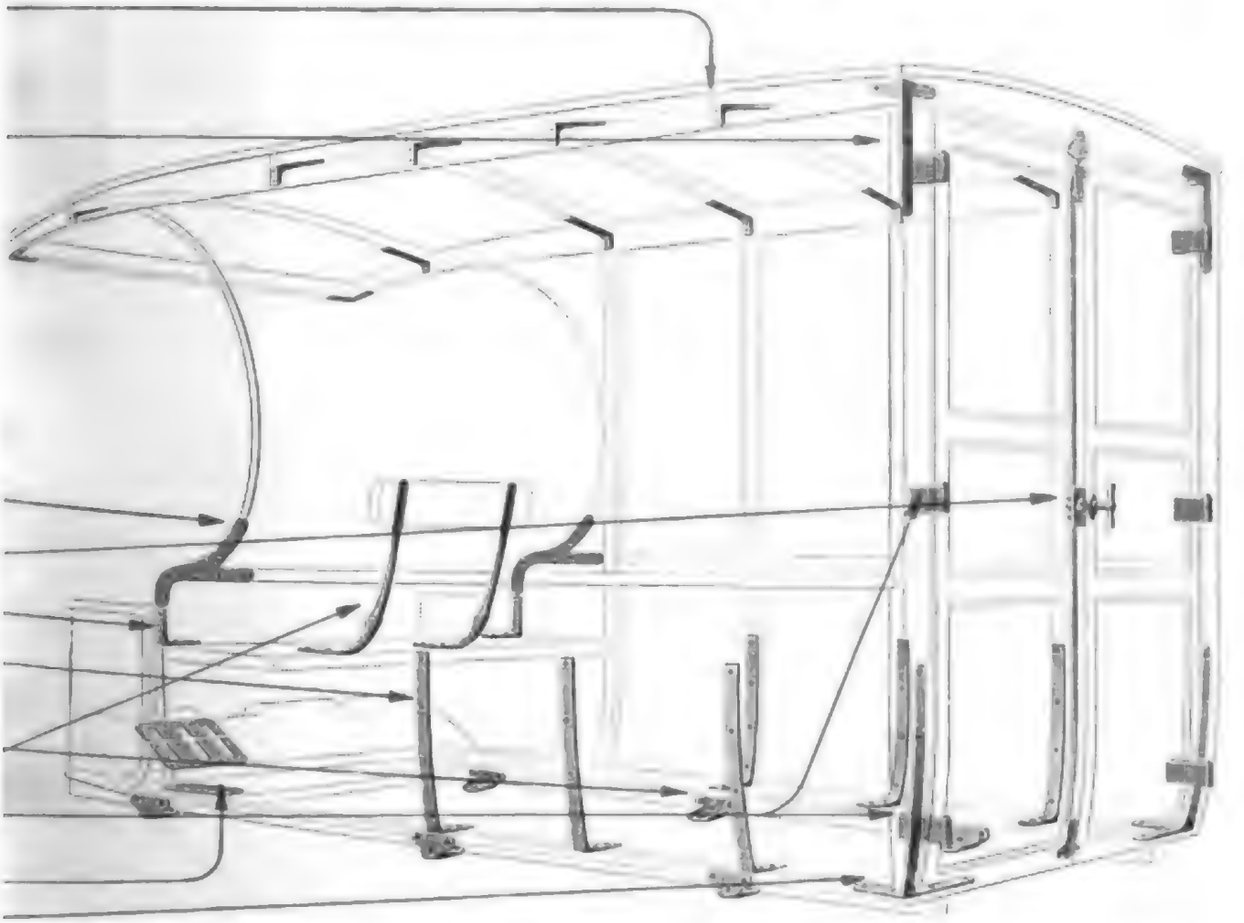
Door lock
Door hinges, upp
Door hinges, low
Rear post, inside
Side post, inside
Roof rail corner
Front arch stay

TH

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E

ABLE IRONS



SET No. 2—FULL PANEL BODY, CURVED SIDES AND END

Irons Needed in the Construction of this Body

. . . . .	1 set	No. 5692
middle	4 pieces	9515-E
. . . . .	2 pieces	9515-H
races	1 pair	6138
races	6 pieces	6135-C
. . . . .	8 pieces	4428-D
. . . . .	1 pair	6134

Rear post, top rail corner irons	1 pair	6220-B
Top rail corner plates, front	2 pieces	4380-B
Seat and body corner irons	2 pieces	4450-A
Jointed lazy back irons	1 pair	5352
Foot board plates	1 set	9512
Body and chassis connections	8 pieces	4485

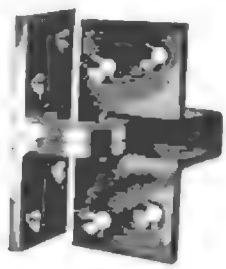
EBERHARD MANUFACTURING CO.

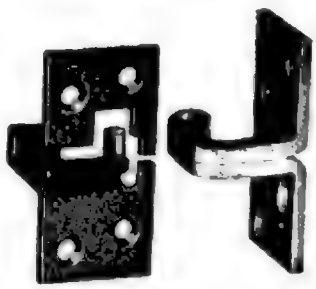
CLEVELAND, OHIO

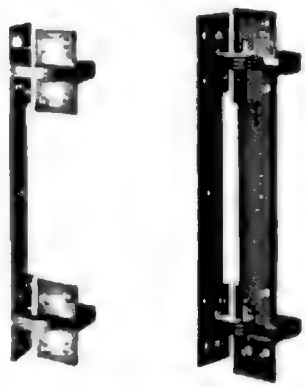
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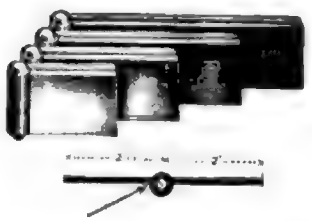
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Concealed, Demountable, Straight, Curved, Blank and Finished, also Deck and Tool Box Hinges.

Made from our own special analysis Cold Rolled Steel.

Standard sizes or special sizes and shapes made to order for every purpose.

Send specifications and we will submit samples and prices

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NEW YORK CHICAGO

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Their Advantages—

Save time and labor in hanging doors.
Insure flush joints and clean lines.
Make greater clearance than ordinarily possible.
Are exceptionally strong and prevent side play.
Can be quickly removed.

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C. COWLES & COMPANY New Haven Conn.
ESTABLISHED 1838
HARDWARE, MOUNTINGS AND TRIMMINGS
Everything for Limousines and Landaulettes

Rubber-Covered Handles; Ventilators; Disappearing Corner Lights; Dome and Pillar Lights; Electric Cigar Lighters; Security Locking Handles; Concealed Toilet Cases; Curtain Rollers; Speaking Tubes; Mechanical Window Lifts; Anti-Rattlers; "Banner" Window Locks; Tail Lights; Filled Moulding, etc.

CURTAIN FASTENERS—All styles and finishes.
BRANDS: SUCCESS, IDEAL, PERFECT, BREWSTER, EXCELSIOR.

STOWE NAME PLATE and ENGRAVING CO.
CHICAGO ILLINOIS
Manufacturers of
Etched Name Plates
For Automobiles, Carriages and Machines
SKELETON RADIATOR SIGNS
DASH and SILL PLATES


Above illustration shows the "SEARS CROSS LOCK" (as magnified) installed on door of a closed body

"SEARS-CROSS LOCK"
FOR AUTOMOBILE DOORS
"The Lock With The Expanding Latch"
(Manufactured under the Ottinger Patents)

MOTOR CAR manufacturers and body builders realize the need of greater lock efficiency. "The Lock With The Expanding Latch" embodies in its construction and functions every point which the ordinary door lock lacks. IT PREVENTS RATTLING OF DOORS—INSURES POSITIVE SAFETY PROTECTION AGAINST DOORS OPENING ACCIDENTLY—OVERCOMES PRESENT DIFFICULTY IN OPENING AND CLOSING OF DOORS—AND AUTOMATICALLY TAKES UP WEAR.

The outward pressure of the rubber stops is taken care of by the inward pressure of the Expanding Latch which holds the doors tight so that they cannot rattle. The holding pressure is supplied by the lock and not by the rubber stops.

The only perfect automobile door lock. Brings about economy in cost of installation. Made for all priced cars, open and enclosed bodies.

SEARS-CROSS CO.
Bush Terminal, Brooklyn, N. Y.

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UZATONA RED

in four shades, ground in either our Japan, Varnish or Oil. This color is adaptable for Automobile, Carriage and Sign Painters' use, and is the strongest and most brilliant red made and permanent to light Quality same as before the war.

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EDWARD SMITH & CO.

Carriage Varnishes

92 Years' Experience in Every Can

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CHICAGO NEW YORK

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Everything from the Bare Wood to the Finishing Coat

USE
"ULTRA-BLAC"
RUBBING VARNISH
"IT CERTAINLY IS BLACK"
ATLANTIC VARNISH WORKS, RICHMOND, VA.

French's Colors

A complete line for the painter of automobiles, trailers, carriages and wagons.

Ground in purest coach japan. You will be pleased with their uniformity, elasticity and durability.

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"DOUBLE DEE"

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Automobile Coach *and* Car Colors

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FOR AUTOMOBILES AND CARRIAGES
FOR RAILWAY AND STREET CARS



JOHNSTON'S "KRAKNO"

Is an Inhibitive Primer and Filler for Metal Surfaces

One of the most perplexing problems of the automobile, street and railway car builder and painter has been the selection of a filler which will produce a satisfactory surface on all new work. The invention of "KRAKNO" has solved the problem.

"KRAKNO" is an elastic, impervious coating for all metal surfaces. It has been time-tried under the most exacting conditions with eminently pleasing results. It is absolutely non-corrosive and prevents further spreading of rust and scale. Practically, it becomes a part of the metal itself after drying, and accommodates itself to all action of contraction and expansion.

"KRAKNO" is elastic, non-corrosive, heat-resisting, impervious to moisture, an inhibitive coating which prevents rust and scale—and is the ideal filler and surfacer.

"Krakno" On Old Work

"KRAKNO" saves you all the time and trouble of burning off and repriming and gives you a perfect job besides. You know what a surfacer and filler that will do what we claim "KRAKNO" does, will mean on all refinishing jobs.

Check up the evidence by trying "KRAKNO" in your shop. Test it thoroughly. Don't wait for a special job to come along, but try "KRAKNO" on your next regular job if you want the most beautiful, durable and economical finish.

Order one gallon or more on trial.

Mail us a post card for a trial gallon. We will tell you just how to use it. If "KRAKNO" makes good for you, you will have made a valuable discovery.

"KRAKNO" is made in the following shades: RED, SLATE, YELLOW, WHITE, BLUE, GREEN, MAROON, GRAY and BLUE BLACK.

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Makers of Paints to Meet Every Need

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Fills a
3 FOLD PURPOSE
being
A Filler
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A Rough Stuff
Performing all functions in ONE operation

Especially recommended for repair shop jobs and for new cars on fenders, radiator shells and other parts hard to rub out of rough stuff.

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B-C Sansco *eliminates over half the work* usually required on jobs for which it is intended. Such a saving of labor will result in proportionately more work with a larger profit on each job. If increased efficiency and larger profits mean anything to you, order B-C Sansco today.

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MIXED CAR LOADS A SPECIALTY

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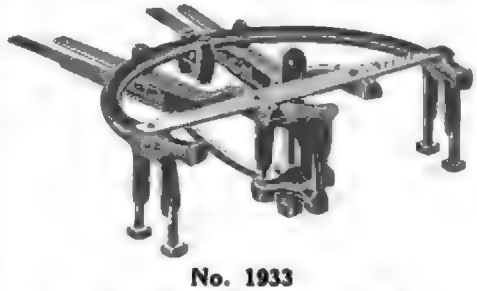
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THE BEST



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Each of the four varnishes, described below, is extremely pale, free flowing, easy-working, heavy-bodied and durable—

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FOR finishing coats only. Pale enough for use over the lightest colors.

Excels in freedom and safety of working. Dries free from dust in four or five hours and hardens in two days.

Possesses an exceptional fullness and depth of finish which it retains to a remarkable degree.

Of unexcelled durability.

Should be used over the best grade of Valentine's Rubbing Varnish.

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FOR finishing automobiles and carriages where quick work is necessary.

Pale enough for use over light jobs, full bodied, works well and dries free from dust in three to four hours.

Hardens over night with an exceptionally full and lasting lustre and wears well.

For the best results it should be used over Valentine's Rubbing Varnish.

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THE best finish for the hoods, fenders and underparts of automobiles.

Extremely pale in color and full in body. It works well, dries free from dust in three to five hours and hard in 24 to 48 hours.

It has great brilliancy, and possesses the hardness of a baked finish and the elasticity of the most durable body varnish.

It resists the destructive action of automobile soap, mud, water, grease, oil, etc., and retains its lustre under the hardest use far longer than any other varnish.

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Dries free from dust in two to three hours and parts finished with it may be safely handled over night. It is second only to Motor Chassis Finishing in its resistance to soap, mud, water, grease, oil, etc.

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Manufactured exclusively by
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Also manufacturers of all styles of welts, gimps and bindings. "Stick-and-stay-stuck."
Patent Prop Blocks and Valances. Cutters of Leather to Pattern

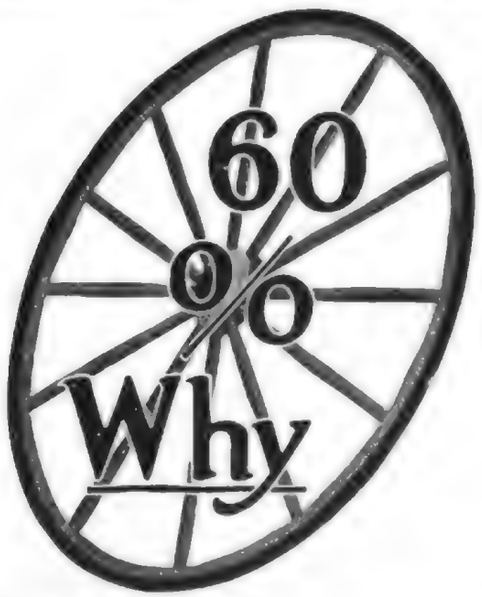
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IT CONCEALS THE TACKS
Makes a slick finish in a short time.

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The "CINCINNATI" Electrical Hand Drill
Can be carried anywhere. Attach to lamp socket and it is ready for work. Great time and labor saver. Economizes power. SENT ON TRIAL
We also make Tool-Post and Bench Grinders. Catalog?
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Firestone made the first successful tire, the tire which remains supremely efficient to this day.
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Firestone invented the present design of channels, accepted standard for the industry.
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Firestone Carriage Tires

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Prices and particulars sent on application.

Bores holes at any angle within a circle of twenty feet or more. USES A FLAT BELT. Has bearings of friction pulley covered, thus overcoming every objection made to the old machine, of which there are thousands in daily use.

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For Rear Doors of Commercial Bodies



Can be Applied Right or Left Handed on Single or Double Doors

Eliminates all Rattle or Sag and Prevents Doors from Getting Out of Shape

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Have the Courage of Conviction.
You Know it Pays to Save.
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Then YOU will be interested in the

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Pure, dry cake soap, ground into powder as you use it, without any waste

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AUG. 31, 1915
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Under extraordinary city and interurban burdens, and the roughest conditions of mining regions, giving a service considered impossible before this new principle was discovered.

Massive, resilient, original in construction — with side air pockets which permit intervening sections to spread like an elephant's toes, on contact with the road — giving maximum traction and mileage and banishing the "rubber wave."

It is already establishing records for the heaviest users of trucks in the world.

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The Replacement Spring



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Spring Service for a Nation *combines*

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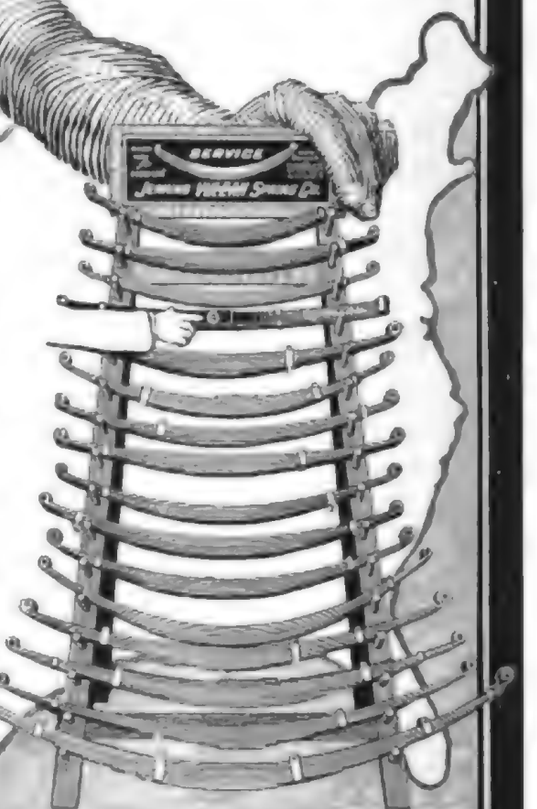
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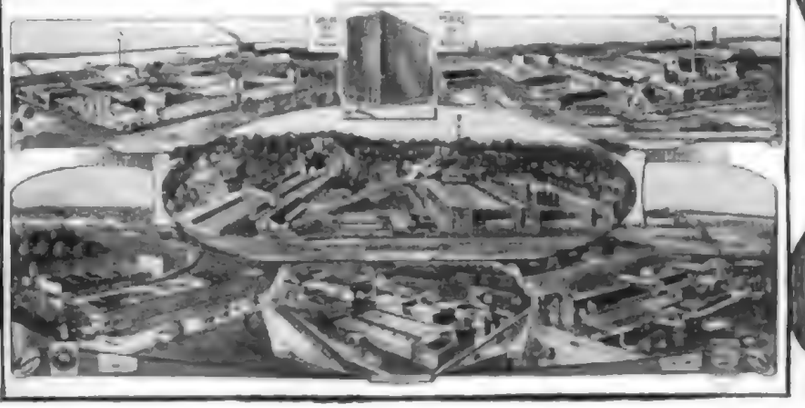
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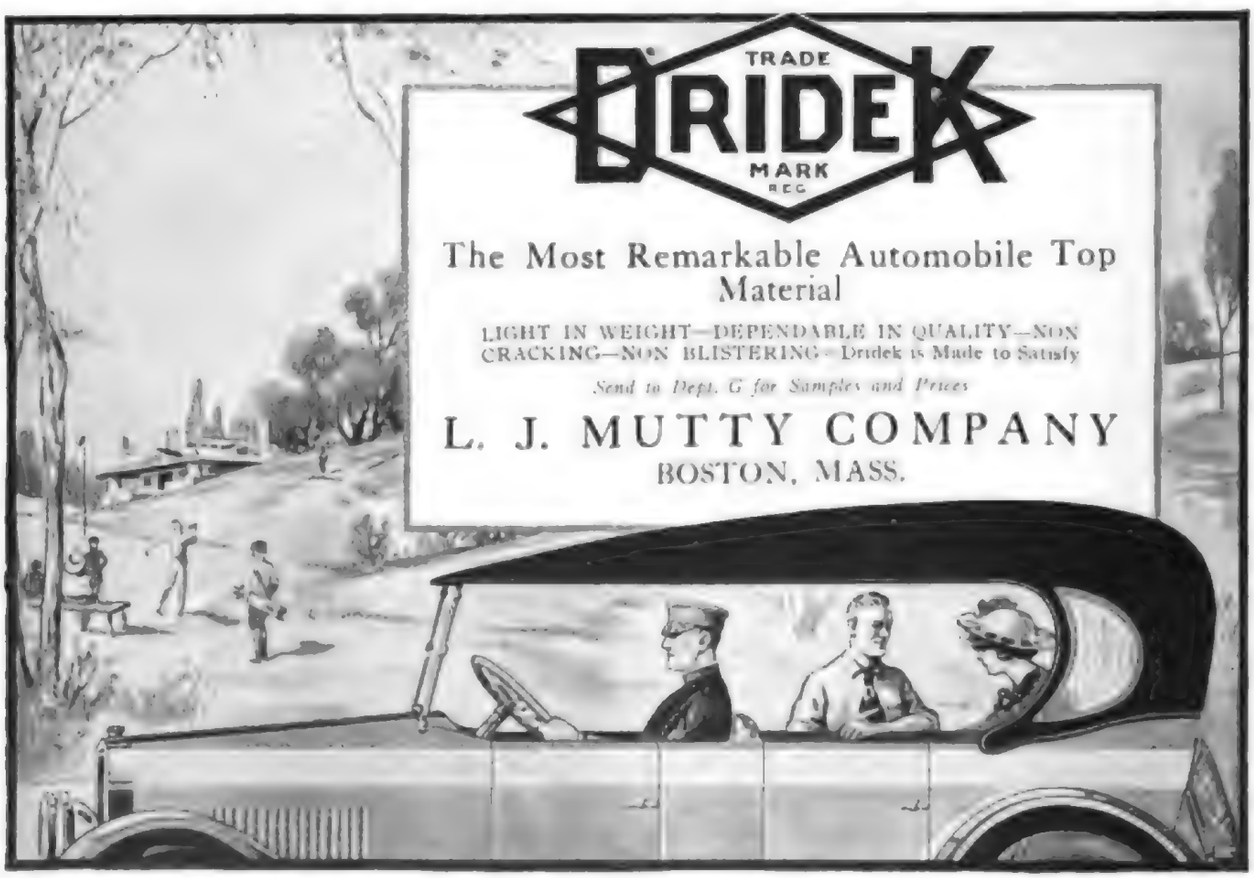
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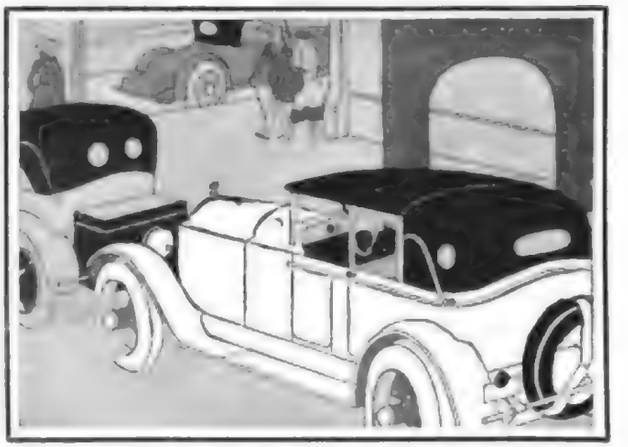
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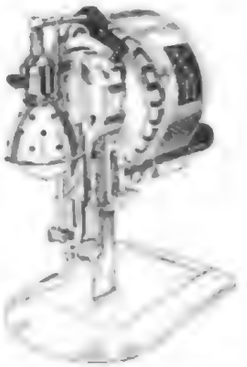
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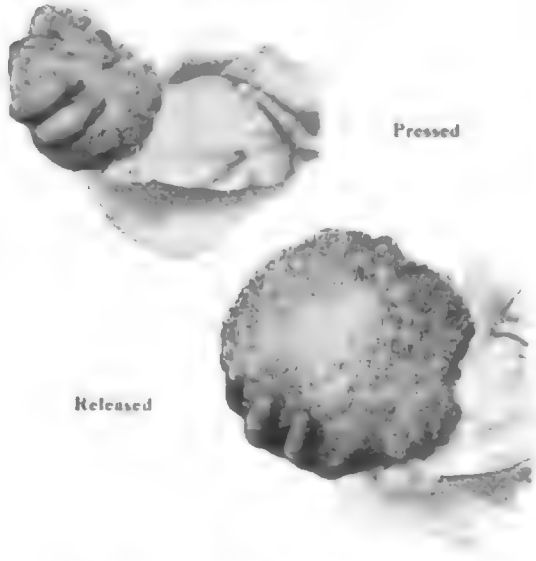
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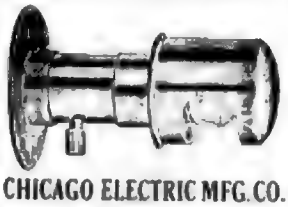
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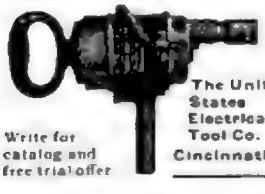
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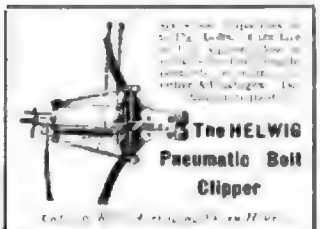
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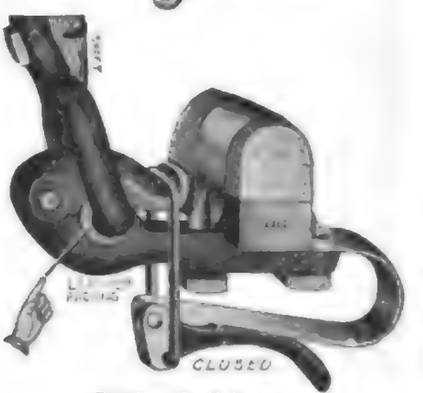
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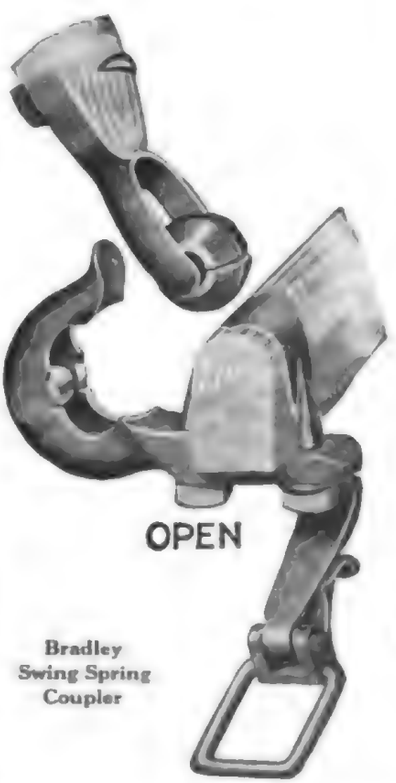




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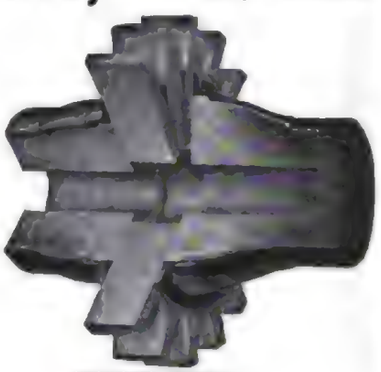


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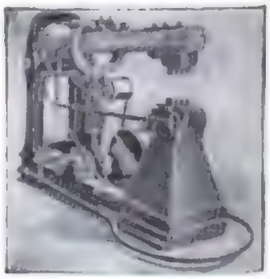
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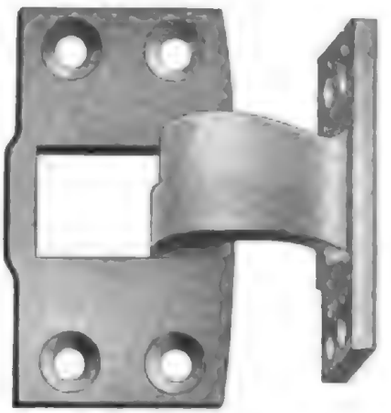
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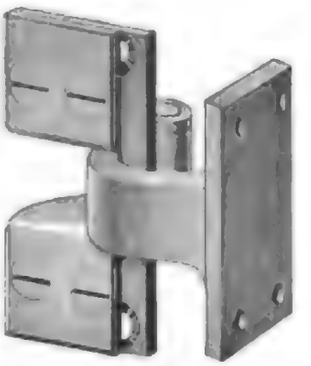
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Body Builders and the Electric Car

Almost all the carriage manufacturers have either gone out of business, or have entered into automobile repairing, or body building, painting, trimming and finishing, but their work is mostly on gasoline cars; seldom on electrics.

The electric-driven passenger cars are built by a half-dozen prosperous concerns in various cities in this country, and each of them has a particular style of its own. Four of these concerns make passenger cars only: the Anderson Electric Car Company build one of the most popular passenger cars and some commercial trucks, and the General Vehicle Company builds commercial trucks only.

Small carriage builders, while occupied with gasoline cars, do repair work only, but do not build new bodies, and do very little in the trimming line. There are many of these small builders who desire to enlarge their business and buy the chassis parts for either gasoline or electric cars, but must avoid installing expensive machinery.

In one case all the parts of the chassis can be bought separately ready to assemble. There are plenty of concerns that have been doing automobile repair work for years, but when put on assembling the chassis parts they are not experienced enough to do it well and quickly. Neither do they possess the necessary equipment.

Is it good business then to buy the parts? Why not buy the finished chassis, as advertised in THE VEHICLE MONTHLY, which are sold ready to run and to fit the bodies on them. This holds good with the gasoline commercial truck and passenger cars, but the electric chassis manufacturer has not progressed so far in this direction as the gasoline chassis manufacturer. They buy the parts and assemble them themselves, including the wiring, but we doubt whether a complete electric chassis can be bought, as is the case with the gasoline chassis, all ready to fit with bodies.

If the body builder can buy an electric chassis, finished ready to place the batteries, and wired ready to fit the body and hoods, same as the gasoline car is sold, it will be a good investment, but to assemble the parts and arrange all the wires needs experienced mechanics.

Below we give a method of assembling an electric car with a chain drive, which are out of date, as the worm drive has replaced them almost entirely, but it gives some of the details, although not sufficient to assemble all the parts without previous experience.

Assembling the Electric

The procedure of assembling the electric as given by a manufacturer who is offering electric automobiles for sale is as follows:

"The gear is a four-spring arrangement with revolving rear axle, secured to a frame similar to a gasoline car frame. The batteries in all cases are above the axles and springs, for which the dimensions must be known. If the frame is straight, it is easy to fit the body, but calculations for lengths must be made between dash board and rear hood. On small cars the rear hood is dispensed with, which gives more room for the body. Almost any style of body can be fitted on such a frame, but if curved, provision must be made for it to fit the sills.

"The selection of such parts, however, requires experience, so that the resultant combination is the best and most efficient. An electric engineer should be employed in the beginning, at least to guide in the selection and furnish a design of merit, at the same time guide the mechanics in assembling the parts.

"All uncertainty of experimenting is done away with, for each part can be purchased from concerns whose engineers have had abundant experience in manufacturing the parts, and whose shop equipment is such to produce accurate and efficient parts.

"A volume of business, perfect shop equipment and experience in manufacture will allow a sale price to the vehicle builder, who assembles the parts."

A much greater saving can be made if the manufacturer of parts would furnish standard frames, assemble all the parts and sell to the vehicle builder the complete chassis same as a number of the gasoline car makers have been and are doing.

Several of these manufacturers, who sell chassis to body builders are regular advertisers in this journal. We do not know of any manufacturers of an electric chassis making similar bids for the body builders' patronage.

Mules

Even in Siberia there are mules. The natives can thank the American doughboy for introducing them. Those who are wise in the way of mules declare that the Siberian climate requires a special knack of handling them. On an ice packed trail leading to Vladivostok a doughboy was driving an especially balky specimen of the Missouri "nightingale" hitched to a barrel-shaped water cart crusted over with ice.

The inevitable happened. He balked. With elaborate unconcern, the driver got out, hitched his sheepskin coat a little closer, and lit a cigarette.

"How about a little whip?" his companion, a Red Cross man, asked anxiously.

"No use," replied the soldier nonchalantly, "a mule usually knows best what he wants to do, and he usually does it when he gets ready. He'll probably get so cold pretty soon, he'll move to keep warm. Then he'll be all right."

Apparently, mules are the only things that don't keep moving in Siberia. At least this much is certain—the American Red Cross is not in the mule class. The Sixty A. R. C. supply train—20 cars of clothing, blankets, medicines and other supplies valued at $38,000 has just started across Siberia to relieve refugees and returning prisoners along the way.

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Every Man's Problem

George Frank Lord, Director of Advertising, E. I. du Pont de Nemours & Company

Today, America faces a grave problem—the readjustment of human relations. It is your problem and my problem, because you and I are Americans. The time has come when the classic principles of the Declaration of Independence must be wholly removed from the realm of academic theory and translated into every-day practice.

That immortal document declared that life, liberty and the pursuit of happiness are the inalienable and equal rights of all. If we accept these principles as true and actually do our part as individuals to put them into practice, our Government and we who are that Government will have solved the whole problem of society and shown the way to the troubled peoples of new-born republics, who are confusing liberty with license and fail to realize the indissoluble bond between power and responsibility.

When Thomas Jefferson wrote the word "life" into the catalog of human rights, he did not mean the mere opposite of death. He meant natural, normal, healthy living protected by mutual order from murder, famine and plague. He meant the right to earn a living and to enjoy the fruits of labor. He meant care and consideration for those too young, too old, or too sick to care for themselves. He meant mutual effort to protect one another from external dangers and internal or individual weaknesses.

Liberty in the Jeffersonian sense means freedom of choice as to religion, location, occupation and mutual government, the security of the home, the common use of nature's common endowments—light, air and water—and the right to buy and own property.

The pursuit of happiness was beautifully phrased to define the hope that springs eternal in the human breast, the craving for a better life, which, though often unrealized, is the inspiration that keeps us all driving our faltering energies through sunlight and gloom, through joy and sorrow, success and defeat, towards the ideal of our dreams. "The man with the hoe—brother to the ox," so realistically pictured by Edward Markham, is the human animal without inspiration. He does not pursue happiness, because he knows of no such state. He eats to live and lives to eat. Jefferson's vision of a free man, an integral factor of a republican government, was just the opposite of the man with the hoe.

All around us we see men and women whose life and creation do not conform to these principles of ideal human relations. These people are actively or potentially Bolshevists. All who conduct their lives and affairs so as to cause such conditions, or who fail to do all possible to ameliorate or prevent them, are creators of Bolshevism.

The war emphasized the powers and responsibilities of the individual.

The celerity with which monarchial machinery disappeared and hitherto unknown individuality rose to power proves the theory of the Declaration of Independence; *i. e.*, that all governing power must be based on the consent of the governed. This is just as true in a monarchy as in a republic, only in the latter it is more fully realized.

In America, especially, the war has done much to bring home to every citizen the fact that the Government is not one thing and he another. He is the Government, to the extent of his participation in its creation and operation. Willingly or unwillingly he must also carry his share of the responsibility for the conduct of the Government of which he is a part.

The war ought to have taught all of us that the answer to the old question, "Am I my brother's keeper?" must be affirmative. You are his keeper, and he is yours.

When you see a man who for any reason whatsoever is not enjoying life, liberty and the pursuit of happiness, it is your duty and privilege to do your bit to correct his condition. You do not need to be an employer or an officeholder to do this. The kind word or deed, the helping hand, and the unselfish, generous act—these are the most powerful expressions of humanity, the most practical recognition of the brotherhood of man.

Since the only real progress or gain is that which is mutual, the citizen, actuated by sincere motives of democracy, cannot knowingly cheat a fellow member of the brotherhood of mankind. That means he will trade fairly, pay all that is right and engage in no business or enterprise not of real service.

Those who take advantage of the ignorance or weak position of others to sell for too high a price, or buy for too low a price, are destroyers of civilization and fomenters of anarchy.

Those who use their brains and opportunities and wealth only for selfish purposes arouse hate and envy and sense of injustice that finally culminates in revolution that destroys all the hoarded assets of the self-centered and greedy.

Men who think are beginning to discover that the code of morals that forms the basis for all the worth-while religious tenets of mankind are not the impractical ideals of cloistered dreamers, but the most practical formulæ for success in life.

Even though your heredity and environment tend to make you a clever rogue, you will be cleverer still if you are honest. Honesty is the best policy.

Even though by nature you are a self-centered hog, you will truly go farther and last longer if you play the part of a philanthropist. Philanthropy pays.

There are 110,000,000 people in the United States. If 1,000,000 of them were today to resolve solemnly and earnestly to do what they could each day to accept and execute their responsibilities in improving human relations, there would be no problem. The remaining 109,000,000 would just naturally fall into line.

Training Helps Workers to Help Themselves

Three-fourths of the industrial workers in America are handicapped by lack of proper training in their respective tasks, according to the U. S. Training Service of the Department of Labor. The work of the service is to increase the efficiency of this "insufficient three-fourths," rather than to stimulate the output of the one-fourth already producing at a satisfactory rate, says a bulletin "Some Advantages of Industrial Training," now being distributed free by this branch of the Government.

Bringing about a big increase in output of the average plant, the Government contends, is wholly within the possibilities, if the following steps are taken: (1) A careful analytical survey of the operations in the plant to ascertain where existing methods can be improved; (2) the formulation of a definite program of training, either in a separate department or "on the floor" in direct conjunction with production; (3) the instruction of those workers who are most in need of it, and (4) the upgrading of those in the next higher strata. A training department helps workers to help themselves.

Another question of keen interest to the working man and the employer alike, taken up in this booklet, is the effect of training on labor turnover. It points out that the turnover for the country at large is at least 250 per cent., placing an annual burden of $1,250,000,000 on our manufacturing industries. Basing his claim on the experience of several score of plants where training has been installed, the author maintains that such instruction in a factory causes a big reduction in turnover. The trained employes can more readily find suitable work and are more easily retained in a plant. Training contributes to a better spirit among employes and develops better teamwork with the employers according to this bulletin. It is one of a series, all of which can be had for the asking. Requests should be addressed to the U. S. Training Service, care of the Department of Labor at Washington.

New York Law Orders Names on Business Vehicles

Under the terms of an ordinance approved by the mayor of New York City on April 24th, all business vehicles are required to have marked thereon the name and address of the owner. This ordinance amends Article 3, Chapter 24, by inserting new Section 40-a, effective June 1, 1919, reading as follows:

"Vehicles, marking of: Every vehicle, other than a pleasure or licensed vehicle, operated on the streets of the city, shall at all times display, plainly marked on both sides in letters and numerals not less than three inches in height, the name and address of the owner thereof."

Cincinnati exceeded its quota by eight million dollars during the Victory Loan drive. The motor car and carriage industries took a keen interest in the campaign.

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Trailer Makers Plan Big Work

An extensive program of work for the Trailer Manufacturers' Association of America was outlined at an all-day meeting of the Executive Committee, held May 15th, in the offices of the association, established the first of May at 110 West 40th Street, New York.

The serious interest of all those in attendance is an indication of the great good to be accomplished through the association for the trailer industry in general. The objects of the association are to encourage the introduction and use of trailers; to further the construction of good roads; to aid in the enactment of suitable traffic laws; to obtain and distribute information for the use and benefit of its members; to do everything suitable toward the general advancement of the trailer industry and of trailer dealers.

Legislation and promotion of a better public knowledge of the trailer and its applications were given most consideration, as being of greatest importance at the present time. It was decided to call for suggestions from all members for provisions relating to the regulation of trailers and to incorporate these in a set of recommendations to be sent to the Highway Industries Association, with a request that they be embodied in the uniform traffic bill which was drafted by a joint committee representing the Highways Transport Committee of the Council of National Defense, the Association of State Highway Officials, the National Automobile Chamber of Commerce, the Highway Industries Association and the American Automobile Association.

It was also decided to work in conjunction with interested organizations to keep in close touch with future proposed legislation, with the object of securing proper laws that will afford protection to the highways and their users without unwisely checking the development of economical and expeditious transportation by highway. To this end, it is proposed to arrange for the introduction of a uniform traffic bill embodying reasonable trailer regulations in the various State Legislatures next winter, and to get prompt advice of all other bills introduced affecting trucks and trailers.

Contact is to be established with State and local motor truck and team owners' associations, automobile clubs, good roads associations and commercial organizations, and to furnish them information and suggestions for action to be taken with respect to the various measures. It will be urged that bills believed to be detrimental to the best interests of commerce and industry in general should be opposed, and those that are just, reasonable and desirable should be advocated. The trailer manufacturers do not intend to oppose all legislation, but plan to initiate and endorse fair measures where no trailer regulations exist.

In the matter of general promotion work, it was decided to make a report to member and some other trailer manufacturers covering an investigation that has been made into the merits and advantages of national publicity, and to begin efforts immediately to increase the membership of the association with a view to providing a sufficient fund for the purpose.

The Southern Motor Manufacturing Association, Houston, Texas, is the latest addition to the membership list, making fifteen members to date.

Trailer Standards Committee Appointed

A Trailer Standards Committee was appointed to confer with the Trailer Sub-Division of the Truck Standards Division of the Society of Automotive Engineers in all matters pertaining to standardization of trailers, trailer hitches, etc. Those appointed on the committee are W. R. Hudson, engineer of the Troy Wagon Works Co., chairman; H. G. Farr, engineer of the Martin Rocking Fifth Wheel Co., and H. W. Perry, general manager of the association.

Trailers Exempt from Revenue Tax

In a resolution passed at the meeting, a vote of thanks was extended to the National Automobile Chamber of Commerce and to R. A. Brannigan, of the N. A. C. C., for their efforts in pointing out to the Commissioner of Internal Revenue that trailers and semi-trailers are not taxable under the Revenue Tax Act of 1918. The Treasury Department, in Regulations 47, just issued, rules that two-wheeled and four-wheeled trailers are exempt.

The committee considered the question of advisability of including motor truck routes as common carriers to be regulated as to routes, rates and stock issues by the Interstate Commerce Commission, as proposed tentatively by Congressman Esch. No decision with regard to recommendations in the matter was reached, but it was the general feeling that, while a certain amount of regulation might be beneficial, insufficient experience in the operation of motor truck transportation lines would make it difficult and inadvisable to establish a fixed scale of shipping rates and that Federal control over the organization and financing of such lines at this time might retard development of such transportation.

Standardized Cost Accounting

Use of a standardized cost account system for motor trucking was approved, and, while not endorsing any specific system, it was the sentiment of the committee that trailer manufacturers should urge truck and trailer operators to install a uniform system so that results can be compared.

The general principle of controlling trailer brakes by air pressure was also endorsed.

In July a general meeting of members of the Trailer Manufacturers' Association will be held. The date and place have not yet been set, but Rochester may be selected.

Members of the Executive Committee in attendance at the meeting were: W. E. Ferris (Ohio), president; R. C. Sykes (Troy), second vice-president; W. R. Bonds (Detroit), C. H. Martin (Martin), H. M. Wood (Trailmobile), representing J. C. Endebrock, secretary-treasurer, and H. W. Perry, manager of the association. Several territorial representatives of member companies were also present, including A. R. Miller, Philadelphia.

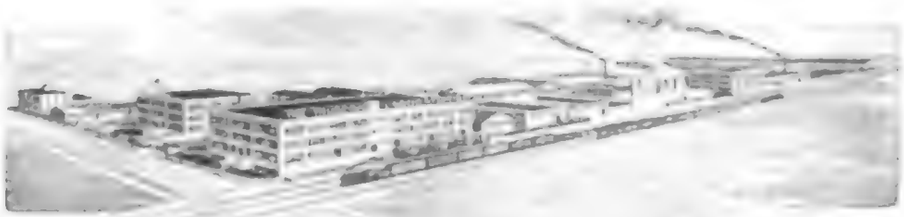


Truck and Trailer Making Fast Time in Stormy Weather, in Inter-City Service.

As one step in a national movement for the construction of roads, the Department of Labor is preparing to issue 200,000 posters bearing on them the slogans, "Build National, State and County Highways" and "Build Good Roads Now." The posters will be issued under the signature of the Secretary of Labor.

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

V.—WELDING OUTFITS AND THEIR APPLICATIONS

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

Oxy-acetylene welding is a highly specialized branch of the motor car repair shop, and the mechanic cannot become expert without practice and study, for skill in welding is largely the result of experience. But in obtaining this experience, study of the methods employed by others is of greatest value, and it is the purpose of this article to describe briefly the welding equipment and methods employed by motor car repairmen to start the new welder in the right direction.

Miscellaneous Welding Equipment

After the purchase of a welding outfit, the next requirement is a welding table. An excellent table is illustrated in Fig. 1. It comprises a sheet or cast iron top, slotted that C-clamps may be inserted through it to hold work, and resting on a steel framework table. This framework is built up of angle iron sides and legs, tied together by strap iron cross ties. The whole is preferably welded together, as practice for the beginner.

Five bricks are placed on the surface so formed as these are found to offer the best material for welding table tops. Certain ones can of course be removed when it is necessary to use the slots for C-clamps, and on this table pre-heating furnaces may be constructed as described in detail later.

The Swivel base vise should be mounted on this table and will be found to be invaluable in holding small work. The drawer beneath can be used for tips, tools, etc.

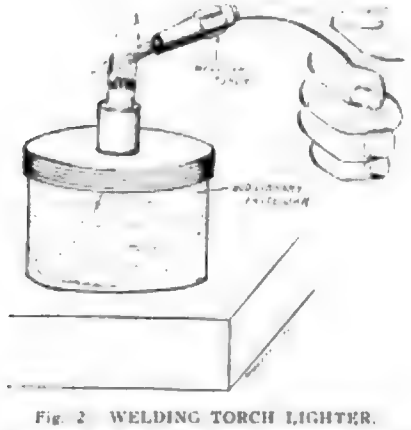


Fig. 2. WELDING TORCH LIGHTER.

To save gas, the welding torch should be shut off when not needed, and on most jobs this necessitates frequent relighting. This may be most easily done by aid of a lighter, as shown above. It is an old library paste jar made over.

Welding Torch Lighter Necessary

In Fig. 2 is shown a simple welding torch lighter. To save gas the welding torch should be shut off when not needed, and with most jobs this necessitates frequent relighting. This may be most easily done by means of a lighter, and the one illustrated is simply made from a library paste jar using gasoline as a fuel. Some welders have an automobile vibrator coil connected to storage batteries and spark plug, push button operated and mounted on the welding torch for this purpose. Others use mechanical lighters, but to use matches is inconvenient, inefficient, expensive and unsafe.

The Welding Outfit Truck

To provide ease of moving the welding outfit, the mechanic should carry the oxy-acetylene and oxygen tanks on some sort of a truck. One such is shown in Fig. 3. It consists of simply a wooden base mounted on castors and having a steel upright post in the center to which are strapped the tanks by means of metal straps. Blocks on the base keep the tanks from slipping. A common form of truck is similar to the common baggage truck, but the truck illustrated in Fig. 3 is easy to construct and extremely handy.

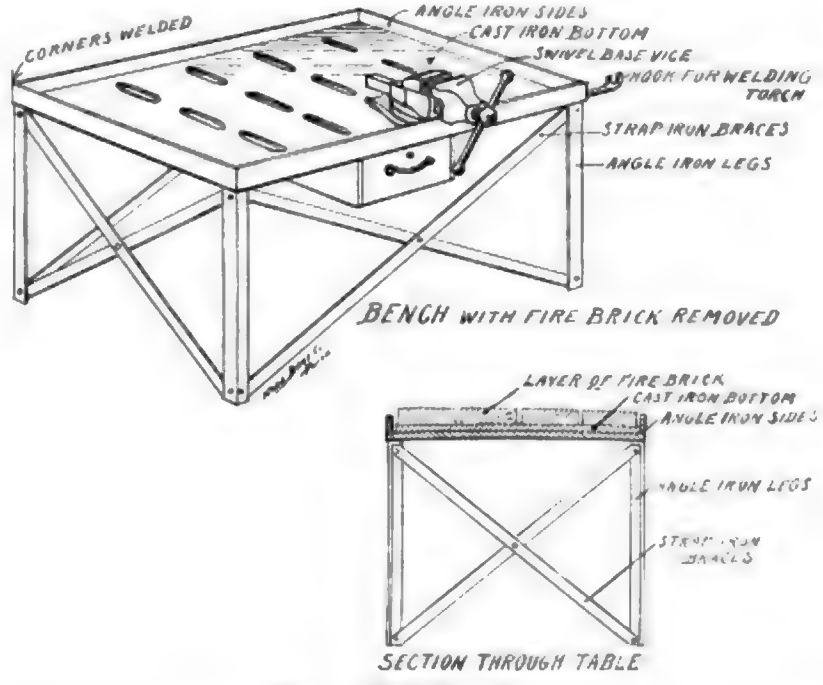


Fig. 1. WELDING TABLE.

Such a table is essential to automobile repair welding, and should be made up by the mechanic for practice.

Miscellaneous Equipment

In addition to the above equipment, the welder will rapidly collect a large assortment of braces, blocks, clamps, arbors, etc., used to support and clamp the work during the welding. These should be carefully preserved in a large box provided for that purpose. After a period it will be found that hardly a new job will turn up but what some of these miscellaneous fittings can be utilized in the work, and being at hand will save much time in getting the job out.

The Welding Outfit

So much for the welding equipment. This is essential to good workmanship at a profit, and where any amount of welding is carried on should be made up. Let us now consider the welding outfit and its use.

In Fig. 3 is shown a typical oxy-acetylene

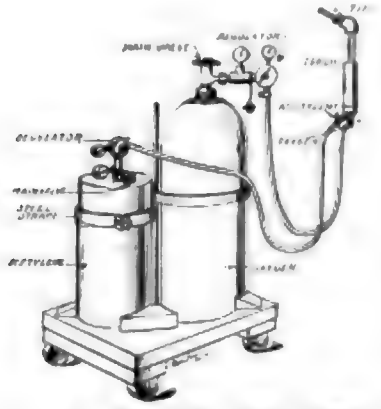


Fig. 3. The welding outfit should be mounted on a suitable truck, such as shown above, for greater accessibility to the work is permitted. The main parts of a typical welding outfit are indicated.

welding outfit mounted on a handling truck. It comprises, in brief, an oxygen (the larger) and an acetylene (the smaller) tanks each connected by a rubber tube to a common nozzle or burner, where the gases from the two tanks mix and burn. The frame resulting from their combustion is extremely hot

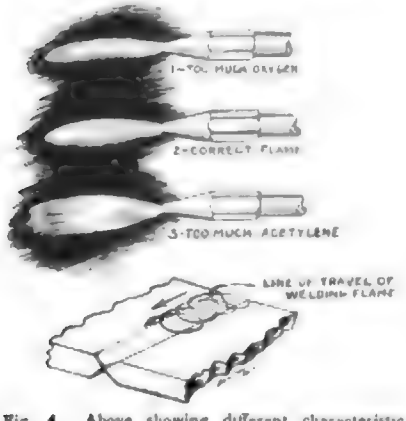


Fig. 4. Above showing different characteristic flames. No. 2 shows the well defined inner cone essential to good welding. The upper flame is a "cutting" flame, the lower one a carbonizing flame. Below—the flame should be passed uniformly over the work. A circular progressive motion, as indicated, is essential to good welding practice.

and may be directed to melt a metal over as small an area as is desired. If the area melted is at each side of a break, the two flow together and new metal may be run in so that on cooling the two parts are one—welded together.

As the pressure of the gases in the tanks is extremely high (around 1,800 pounds per square inch in the case of oxygen), a reducing valve is necessary to automatically cut down the pressure. The exact amounts of gases used are regulated by the valves in the welding torch, however, the size of the welding flame being further determined by the torch tip chosen. The small tip is used for light work; the larger being used in succession as the thickness of the work increases. Experience soon teaches the proper tip to be used in any case.

Welding Flame Adjustment

Fig. 2 illustrates the three possible plane adjustments—namely with (1) Too much oxygen; (2) correct proportions of oxygen and acetylene; (3) too much acetylene.

The welding flame is the white inner cone, which when properly adjusted is about three times as long as it is wide and is sharp and distinct.

The following is the method ordinarily employed to obtain proper adjustment:

1. Turn on and light the acetylene.
2. Turn on the oxygen.
3. Set the regulator gauges at the manufacturer for the tip being used. (For economy use on small tip).
4. Cut down the acetylene until the welding flame cone is well defined.
5. Keep this flame condition throughout the work.
6. In shutting down, turn off the oxygen first.

Welding Motions

A regular systematic motion of the welding flame over the line weld is essential to the uniform results. On such the "spiral" motion is shown in Fig. 4. Others are termed the "Fig. 8," and the "Fig. Lag." Such a motion tends to prevent the formation of pockets and distributes the welding heat evenly.

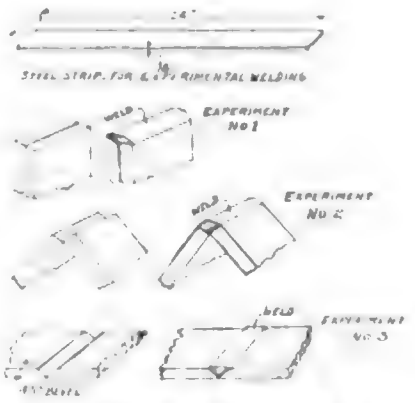


Fig. 5. The beginner should experiment on different kinds of welding, to get used to handling the tool. After each experiment, the test pieces should be broken apart and the welds examined.

Welding Experiments for Beginners

Before starting any actual repair work, the beginner should experiment on different kinds of simple welds for practice. Several excellent experiments are outlined in Fig. 5, and in each case after completing the weld the parts should be broken open and studied. For as yet no method has been found to determine whether a completed weld is good or bad, except by breaking it open. And by breaking a few, the welder will soon see

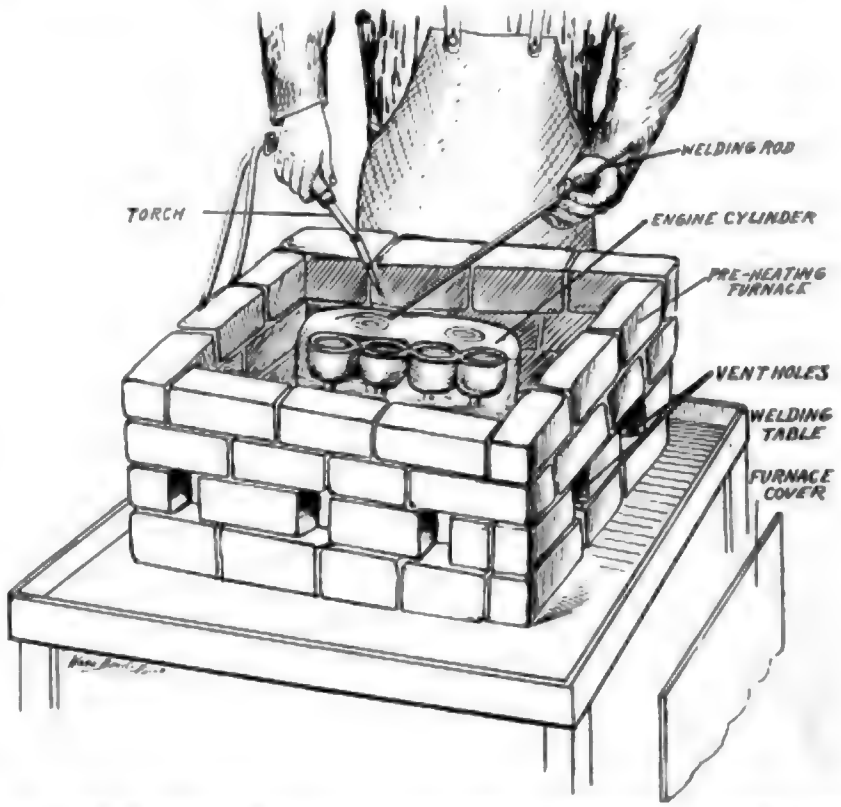


Fig. 6. Cast iron cylinders must be preheated before welding to prevent warping. This is done by means of a coke fire in a firebrick furnace built on the welding table. The cylinder must be welded immediately after the furnace cover is removed.

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whether he is doing good work and can proceed with confidence on actual repair work.

Necessity for Pre-Heating

Except in the case of simple repairs, it will be found necessary to pre-heat the parts before welding. If this is not done the parts will be warped by the local heat of welding, and if the parts be large an excessive amount of gas will be used.

On small work, this pre-heating may be done with the welding torch; on larger work by a blow-torch or forge. And on real large work it may be necessary to use a pre-heating furnace and charcoal or coke fire. When a part breaks or warps on cooling, it is a sign of insufficient pre-heating, and this is one of the greatest causes of poor welding practice.

Welding Automobile Cylinders

Particularly is pre-heating necessary in the case of welding automobile cylinders. The following is the method to be employed:

A pre-heating furnace of fire bricks is constructed (see Fig. 6) having vents at the bottom. In it the cylinder to be repaired is placed; with the break at the top so that it is accessible. The furnace is then packed with hardwood charcoal, ignited by kerosene in several places, covered with a metal plate, and the cylinder allowed to "soak" for a couple of hours.

At the end of the period the top is removed and the repair made quickly as possible, leaving the cylinder in the furnace, and keeping it protected from drafts all possible. When welded, the cylinder should again be covered with fresh charcoal, the metal top replaced, and allowed to soak and subsequently cool before removal from the furnaces. This procedure removes all warping strains, providing the initial pre-heating temperature was high enough; and the resulting job is permanent.

Welding Aluminum Cases

Pre-heating aluminum crankcases, transmission cases, etc., is necessary prior to welding, but here the heat from a blow-torch or welding torch is adequate. The chief requirement is securing the parts in alignment before welding, and holding them there until the work is completed.

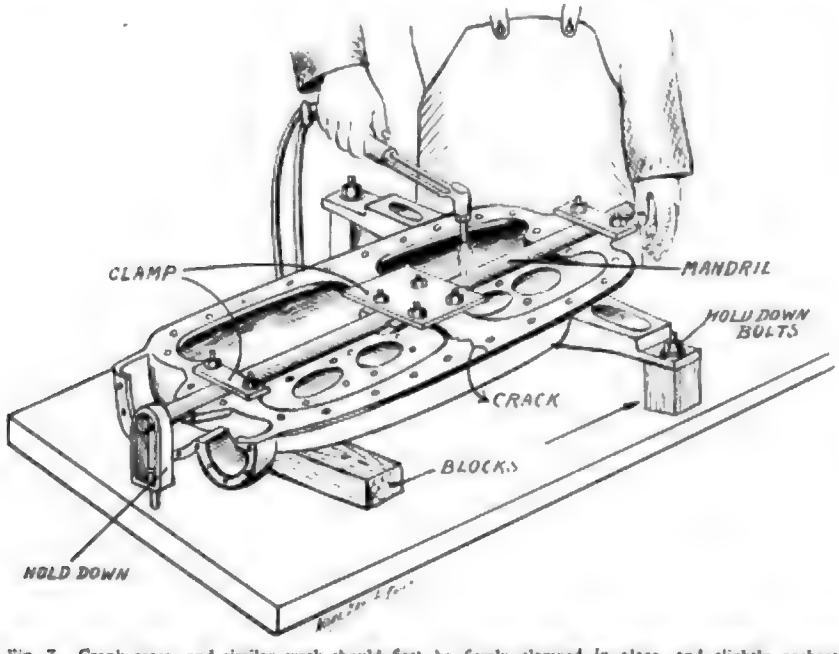


Fig. 7. Crank cases, and similar work should first be firmly clamped in place, and slightly preheated with a blow torch, or a welding torch, before welding. Then the work can be done without fear of warping. The above shows the method of clamping and preheating an aluminum crank case.

Fig. 7 illustrates a method of clamping an aluminum crankcase to the welding table during welding. The clamps and blocks are so applied that the edges of the break are brought together, and that a straight edge passed over corresponding finished surfaces shows them to "line up."

Notes on Welding

Little has been said concerning the detail steps in welding practice. The necessity of bending the edges of the metal before welding certain parts; use of fluxes; puddling and time welding of aluminum, etc. For this information is usually given in detail by the welding outfit instruction book.

However, one further point is to be noted—never purchase anything but the best procurable welding rods, fluxes and material. For money saved here is lost in spoiled work.

A condensed history of the war, with maps in colors and a day-by-day chronology of events, has been issued by J. A. Fay & Egan Co., Cincinnati, Ohio, makers of the "Lightning Line" of wood-working machinery. This company will be glad to mail a copy to any vehicle builder who writes for it on his business stationery, or enclosing his business card.

Some Hints on Brush Work

By A. J. Morrow.

The manner of mixing colors most suitable for wagons, auto bodies and chassis varies to a considerable extent. The painter should be guided and governed greatly by the nature of the color desired and the time he is allowed in which to perform the work.

Such colors as coach black, Tuscan red, chrome yellow, coach green and blues of the best quality are manufactured today by numerous paint houses and, ground in the best grade of coach Japan, they require but a small quantity of rubbing-varnish to bind them; then thin to the proper working consistency with turpentine.

These colors, with the exception of the yellows, should be spread with a two-inch or three-inch flat camel hair brush, for the flat coats and a two-inch flat white bristle brush for the color in varnish. The yellows and lighter shades of yellows, blue and green, where white lead is added to lighten the shade, should always have a very small quantity of linseed oil in the mixture and be spread with a two-inch or three-inch white bristle brush, according to the size of the surface to be coated.

An expert painter, with this mixture, can cover a large space with the bristle brush, and can make a solid looking job of light yellow or cream yellow with three coats, where five coats would be necessary with the camel hair brush, and still not be covered evenly or as solidly as the bristle brush will cover.

To insure success paint as follows: Flow your color on heavy and full as though it was finishing varnish; take in the full panel, no matter how large. The small quantity of oil in the mixture will prevent it "setting up." If you lay on lengthwise, then cross it up and down, after wiping out the brush lightly. Lay it off lengthwise again, wiping out the brush as before if it shows brush marks, cross it up and down, but pressing very lightly on the brush, and in this manner cross and recross with hardly any pressure on the brush until your panel will be as smooth as glass and a problem to the most critical to decide just what kind of a brush was used in the accomplishment of the work.

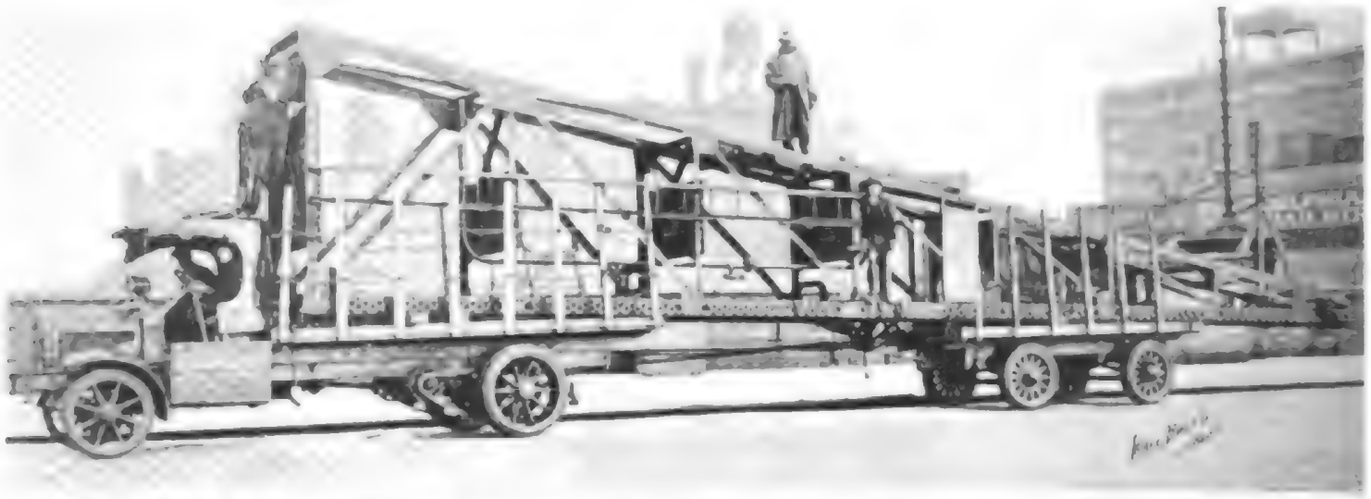
Colors for the chassis can be so manipulated that but two coats are necessary. The old chassis requires scraping with a knife and washing with gasoline, after which shellac those places where there is a suspicion of grease or any substance that may retard drying. The best ground color for a number of colors is the pale gray, mixed to dry flat, then follow with the last coat of color in varnish, when the chassis is ready for striping if any is required. Finish with a good heavy coat of gear finishing varnish.

A total lumber production of 32,760,000,000 feet is the estimated cut for the year 1918 on the basis of partial returns received by the Forest Service of the United States Department of Agriculture from 731 sawmills.

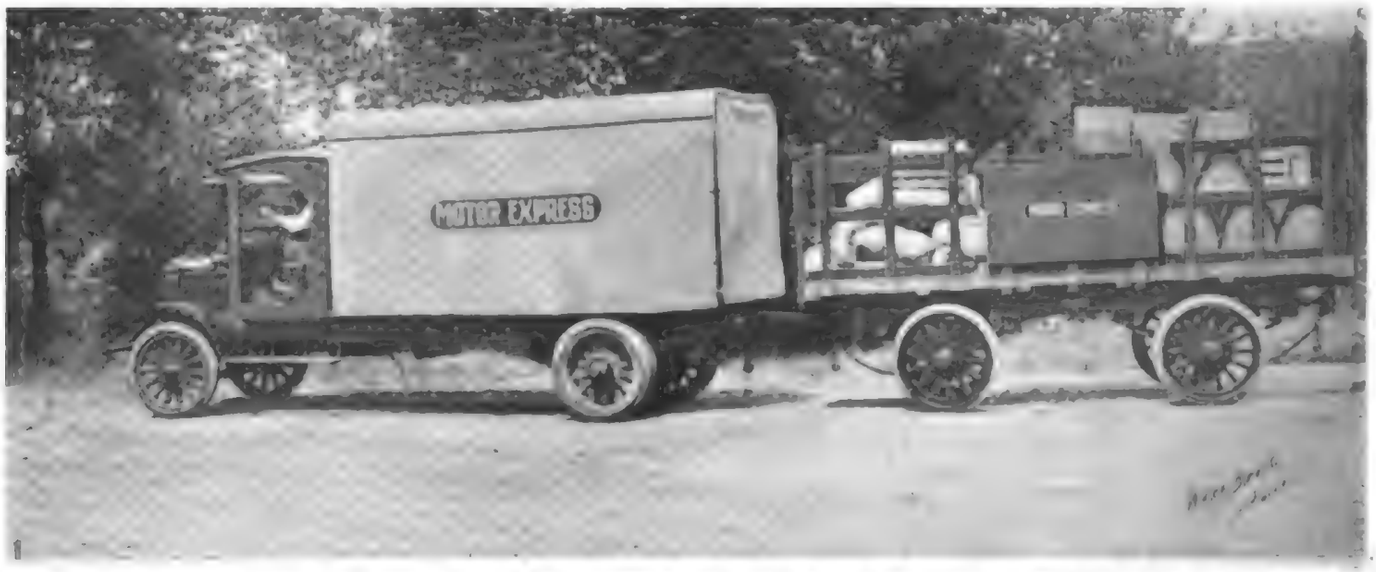
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Interstate Motor Express Line, operating out of Chicago, to Hammond, Kenosha and Milwaukee, doing a general express business. The trailer has been proven an indispensable feature of the equipment.



These steel loads, 65 feet long and weighing fourteen tons, were moved a distance of twenty-five miles by means of a White truck and a trailer



Rural Motor Express Line operating in Tennessee, running from Chattanooga into Atlanta, Ga. and Birmingham, Ala., loaded with all kinds of food products. This is a Service truck of 3½ tons, which is hauling a 3½ ton Troy trailer. It operates over the Dixie Highway.

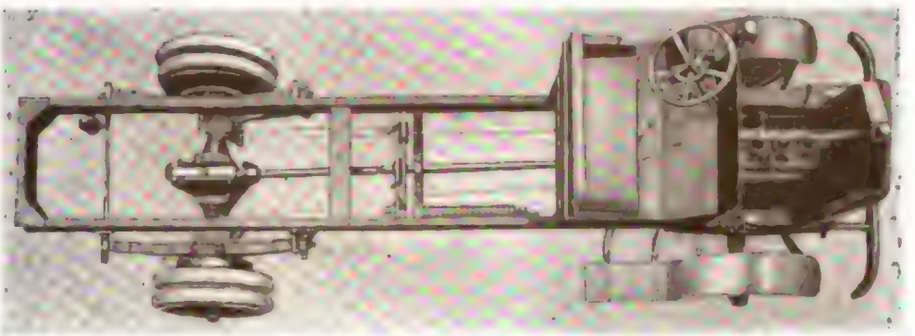
TRUCKS AND TRAILERS THAT ARE SOLVING AMERICA'S TRANSPORTATION PROBLEMS

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Rowe
THE PIONEER WORM-DRIVE TRUCK

Extraordinary Quality

Is Built Into Every Model



Airplane View of the Rowe Chassis. Note its simplicity

5 Capacities—2, 2½, 3, 3½, and 5 Tons

SIMPLICITY of construction makes the ROWE a trouble-free truck.

Highest class units provide efficiency beyond question.

A frame of unusual strength gives stamina for years of service.

ROWE trucks are doing remarkable duty in all lines of business. They're widening business areas. They're increasing users' profits. And, because *The Rowe Runs Right*, it is "bringing home the bacon" for dealers.

Some of the ROWE'S strong talking points are given on the next three pages.

ROWE MOTOR COMPANY

LANCASTER, PA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

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Rowe Rowe

The Rowe Heavy Duty Truck

FIVE-TON MODEL



Ever see a more sturdy specimen?

IT is not slow and unwieldy, however, but makes a quick get-away, even when fully loaded, and is a wonder at negotiating grades.

Contractors, Foundrymen, Lumber Companies, Paper Houses, Movers and many other business organizations are using the ROWE 5-Ton Truck with great satisfaction and economy.

It is fully guaranteed in every part

ROWE MOTOR COMPANY

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ROWE RUNS RIGHT ROWE RUNS RIGHT

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Four Speeds Forward

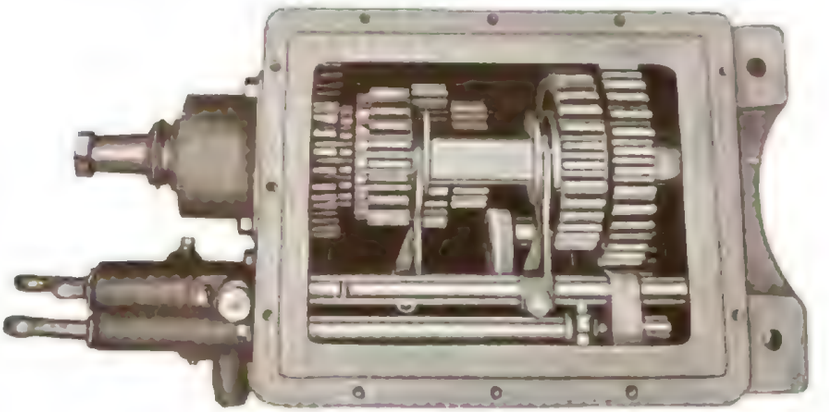
THAT'S THE BIG TALKING POINT

of the

Rowe Main Frame Transmission

USED ON FIVE-TON MODEL SHOWN ON OPPOSITE PAGE

IT IS A SELECTIVE SLIDING GEAR TYPE. GEARS SPECIAL TRIPLE HEAT-TREATED.



Additional Features That Put Punch Into Selling of the 5-Ton Rowe:

MOTOR: 48 horsepower, 4¼-inch bore by 5½-inch stroke; 4-cylinder, cast in pairs; cooled head. Three-bearing crank shaft of liberal proportion made of heat-treated chrome-nickel steel.

CLUTCH: Multiple disc type of special design. Raybestos and steel.

LUBRICATION: By gear pump driven by the cam shaft and accessibily located on the side of the motor. All moving parts are constantly covered with a spray of oil.

IGNITION: Bosch high tension magneto.

CARBURETOR: Zenith.

COOLING: By the tested and proven pump system, with unusually large radiator capacity. Cellular radiator, heavy spring suspension protected by special radiator collision guard of type now used on U. S. Army trucks.

REAR AXLE: Worm gear, housing type with David Brown worm gear. Worm special steel, heat treated, with hardened steel differential gears. Roller and ball bearings are used throughout.

STEERING GEAR: Irreversible, of the worm and nut type, operated by a 20-inch wheel.

ROWE MOTOR COMPANY

LANCASTER, PA.

Rowe
THE PIONEER WORM-DRIVE TRUCK

3000 Trucks Per Year

THAT CAPACITY SHOWS WE'RE WELL ABLE TO GIVE DEALERS GOOD SERVICE



Partial View of Our Big Machine Shop

The Rowe plant has been built and equipped with the thought of efficiency uppermost in mind. Thoroughness is the big idea in all departments, and every Rowe truck must pass a most exacting test before it is shipped to a customer.

Rowe dealers can thus rely upon satisfied patrons.

Rowe builders stand back of their product, desiring the dealer's good will as well as his orders. It's not too late to secure high-spot territory, but don't delay getting particulars.

ROWE MOTOR COMPANY
LANCASTER, PA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

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"Vehicle Monthly" Time Savers

"The Vehicle Monthly" will appreciate the receipt of any "Time Saver" made by its readers. A rough sketch and a short description are all that is necessary.

(This series of "Time Savers" was begun in February, 1919. Back numbers may be had from the publishers)

"Vehicle Monthly" Time Saver No. 21
BATTERY FRESHENING RACKS

Battery service stations often carry a supply of rental batteries, and these may be kept in serviceable condition by means of freshening racks. These racks comprise shelves, above which are conduits with a number of type C condulets, having a two-hole porcelain cover with nipple attachment for an incandescent lamp. Leading from each outlet are two large insulated cables and attached to each is a clip. Each outlet will handle 14 three-cell batteries, and carbon filament lamp are used.—J. Lawrence Hill Co., Inc., Rochester, N. Y.

* * *

"Vehicle Monthly" Time Saver No. 22
BATTERY RENTAL RACK

Where many rental storage batteries are handled it is necessary to know at all times how many are on hand; how many out on rent, and to whom rented. This information is readily kept by means of a battery rental rack. This rack comprises two boards mounted so that they may swing in a frame. Brass card holders are attached to each side and in these cards are slips carrying the necessary data.—J. Lawrence Hill Co., Inc., Rochester, N. Y.

* * *

"Vehicle Monthly" Time Saver No. 23
INSTRUCTION CARD RACK

Shop instruction cards covering work in progress may be kept where they may be seen at a glance by means of an instruction card rack. The feature of this rack is that the face of the retaining space is glass, and through it the cards may be seen and read without removal.—J. Lawrence Hill Co., Inc., Rochester, N. Y.

* * *

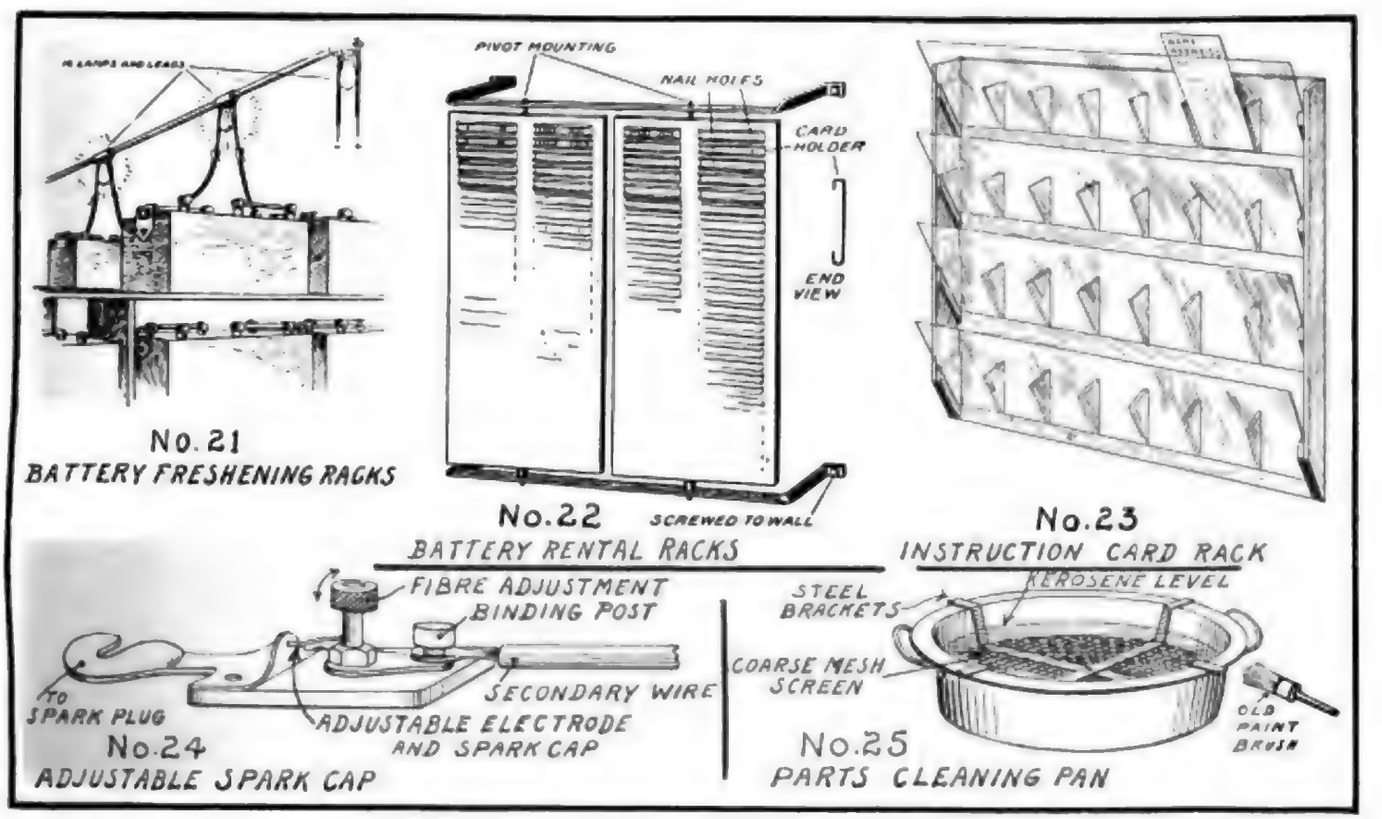
"Vehicle Monthly" Time Saver No. 24
ADJUSTABLE SPARK GAP

In testing engine ignition, it is often desired to "cut in" and "cut out" certain sets of cylinders as well as to determine the quality of spark each cylinder is getting. This may be done through the use of adjustable spark gaps constructed as illustrated. The adjustable electrode is printed so that it may be turned, increasing or decreasing the gap, so that the spark may be examined, or cut out. This device is only used in engine testing.

* * *

"Vehicle Monthly" Time Saver No. 25
PARTS CLEANING PAN

An old dishpan may be modified into an ideal cleaning pan for small parts. A drop frame of strap iron is constructed as shown, and on it is soldered a coarse mesh screen. The level of the kerosene is brought about two inches over this screen, and the grease is removed from the parts by a brush. All dirt and grease removed drops through to the bottom leaving clean liquid at the top for use.



"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ABOVE

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Oxy-Acetylene Welding

By J. H. Davies, Central Technical School, Leeds, England.

It is quite certain that the experience gained in aircraft construction will be applied to many sections of motor body building. In these days, when the costs of production have risen so enormously, it is only reasonable to suppose that much time and research will be devoted to simplify working details, so as to bring down working costs to a minimum. We may therefore anticipate increased attention being directed to oxy-acetylene welding as likley to supersede in many sections the ordinary operations of smith's work.

Mr. Davis asserts that it is well known to every one who takes an interest in autogenous melting and welding processes, that the existing opinion as to the value of the processes, and the practical results obtained differ widely. The chief ground for the uncertainty that exists in regard to them, lies in the fact that these new processes have only recently been introduced in industrial practice, and rest entirely upon empirical bases. Although oxy-acetylene welding is now extensively practiced, and is of great theoretical and practical interest, it has never been made the object of systematic and exhaustive research.

Both in the United States and Germany great progress has been made, the latter country being far more advanced than Great Britain in the oxy-acetylene process. They have carried out systematic and exhaustive researches, their operators are scientifically trained; they are taught metallurgy and chemistry, including the chemical compositions and melting points of all metal and oxides; they make test pieces for experimenting with chemical and mechanical tests, and by microscopic and macroscopic examinations, both of the melted zone and the neighboring parts; their welding as a rule is very neat, as they are not allowed to execute commercial work until they have become fully proficient and competent.

The oxy-acetylene processes, when properly worked, possess numerous marked advantages over all others. In the first place, the operating flame can be easily controlled, and the temperature attained at various zones can be readily regulated.

In the second place, the work can be readily accomplished owing to the high temperatures reached (3,500° C.). The appliances are easy to handle, and reliable in operation.

Necessary Conditions for Good Results

The most important conditions for securing good results are:

(1) The use of the purest acetylene possible.

(2) The use of a blow-pipe so designed as to ensure accurate adjustment in the proportion to the mixed gases, and to secure their exit at a velocity capable of maintaining the metal sufficiently fluid without the melting flame being too rigid.

(3) The use of an absolutely pure welding rod.

(4) The provision of an absolute neutral zone in the melting flame, neither oxidizing nor reducing.

(5) The edges must be free from all impurities, and if over ⅜ inch thick, the edges must be beveled; if over ½ inch the edges must be beveled on both sides.

(6) The use of de-oxidizing agents eliminating the oxides in view of unavoidable oxidation of the metal subject to the melting process. It is necessary to bear in mind the relation between the melting points of the oxides and that of the metal itself, which is a most important matter.

(7) Rapidity in melting in order to avoid excessive heating which will not only alter and deteriorate the original structure of the metal, but would even favor the occlusion of gas (particularly hydrogen), and so occasion the formation of blow-pipes in the melted zone.

In addition to these considerations, care should be taken to see that no cooling takes place. The condition may have to be modified on account of the conductivity and specific dilation of the material as well as to the relation to the thickness, size and shape of the pieces operated upon.

Experiments have been carried out on molten metals, both before and after subjection to mechanical stresses, in order to ascertain to what extent, if any, the various constituents are influenced by the process. Researches have been further carried out on the mechanical properties of various steels when subjected to the strong heat of the flame, without being melted, and for the same period of time as might be required for the autogenous welding of the same sized pieces.

The first experiments were carried out on boiler plate 0.393 inch thick, of which the chemical composition was as follows:

	Per Cent.
Carbon	0.105
Manganese	0.510
Silicon	0.024
Phosphorus	0.025
Sulphur	0.053

The welding-rod used was pure Swedish charcoal iron ¼ inch diameter, practically free from sulphur and phosphorus.

After the samples were welded, some were cooled in air, others went under special treatment and mechanical operations; finally mechanical tests were made on rough unmachined samples; before and after mechanical tests a piece of metal was taken from the melted zone and from the neighborhood of the weld for microscopic examinations.

Summary of Tests

A summary of these observations on carbon steel shows that:

(1) The violent heating and the sudden melting undergone by the metal profoundly alter its quality.

(2) The alteration in the mechanical qualities (tenacity and elasticity) cannot be remedied by simple hammering on the melted zone, which often proves to be most injurious to high-carbon steels, but must be coupled by proper thermal treatment, such as annealing carried on for thirty or forty minutes; further quenching has also the greatest influence on high-carbon steels.

(3) A remarkable influence on the mechanical properties is to be attributed to cooling processes, the slowest cooling being the best and most efficient.

(4) Apart from the alteration in mechanical properties, very important modifications take place in the chemical constitution; these changes consist chiefly in diminution in the percentage of carbon, silicon, and manganese, but this defect may be modified by using a welding rod with a higher percentage of these oxidizable elements.

For those familiar with the oxy-acetylene welding and cutting process, it is not difficult to appreciate its varied applications and important advantages. The ease and rapidity with which experienced welders can carry out repairs *in situ* and the portability of the plants, make the process valuable, and the service rendered by this process in the many workshops is particularly valuable, where the welding of articles of all kinds is a daily necessity.

The oxy-acetylene process occupies a leading place in the airplane and airship industries; it has the advantage over all other systems of joining, in diminishing the weight of parts, so that parts previously made from wood or aluminium castings are now made both lighter and stronger from sheet and steel tube. The frequent repairs to engines and other details including the repair of cracked cylinders and broken aluminium crank and gear cases further emphasize the new power the process offers to the aircraft industry. Further, the value of cutting with this process has no rival whatever, and the ravages of warfare open up an extensive field for it, both during and after the termination of the war. The demolition of bridges and steel structures blown up by the Allies or enemies is an important application of this process. The cutting of armor plate again emphasizes its unique field of usefulness.

The oxy-acetylene flame has recently been applied to the case-hardening process, and some firms are using this on a large scale. It is well known that the flame containing an excess of acetylene is a very energetic carbonizer. If the flame is held for a period of two minutes on the white hot surface, a hardness equal to that obtained with the most energetic case-hardening mixture is obtained: if this is prolonged from five to ten minutes, it will penetrate to ⅛ inch depth.

Summary of Advantages

The many advantages oxy-acetylene has over other processes may be summarized as follows:

It can be applied to almost any class of work; it can weld 30-gauge steel or 1½-inch boiler plate; it can cut mild steel up to 24 inches thick; and it will weld any commer-

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cial metal such as cast-iron, aluminium, copper, bronze, lead, zinc, etc.

In the repair of broken machinery and parts, it has no rival; the repairs can be executed quickly, and many repairs may be executed without dismantling; the cost in many cases is infinitesimal, compared to the cost of a new part.

It can now be used with advantage in the manufacture of safes, tanks for oil, caustic soda, or other solutions, the jointing of pipes, steam superheaters, metal casks, petroleum barrels, artistic ironwork, adding metal to parts worn by friction, filling up holes or parts of new structures cut away in error, welding of tool-steel ends to common steel bars for turning and cutting tools, the welding of copper, brass, or iron tubes.

The equipment is extremely portable, and can be used within a few minutes of being loaded, the power of the heating flame can be far more accurately regulated than electric current. The flame can be used for pre-heating, hammering, and annealing after welding, thereby ensuring a uniform soft metal, a method not practicable in the electric process.

In the welding of light sheet steel, it has an unrivalled field; with a 24-gauge metal, 45 feet per hour can be welded, with a consumption of only 4 cubic feet of oxygen and 3 cubic feet of acetylene. On the other hand, when the metal reaches $\frac{1}{8}$ inch thick or over, electric welding has the advantage both in speed and cost.

Necessity of Organized Instruction

When the process of oxy-acetylene welding was first introduced into this country, its apparent simplicity led many engineers wrongly to assume that welding appliances might be regarded as general workshop tools, which any inexperienced but handyman could operate with success, consequently much work has been condemned wholesale because of defects in the weld. This is not the fault of the process, but of inefficient workmen. Today the business has grown beyond the limit of personal supervision, and the necessity for organized instruction of operators is becoming more and more obvious, both in the interests of workmen and employers.

Welding schools are now established in various centers, and a stream of fairly qualified welders is already flowing from these schools into workshops. They teach the students under practical conditions of the kind of flame for different work, the principles under which the blow-pipes are constructed, the way to handle them, and a variety of practical and technical points which are bound to be helpful to them in their subsequent career. No man should be regarded as a competent operator until he has a clear and intelligent understanding of all points appertaining to the process; he should be a fair metallurgist and chemist, and know the melting points of all metals and oxides and chemical compositions, and be conversant with mechanical and thermal tests.

There are estimated today to be not less than 30,000 employes in this country working the process of oxy-acetylene welding; 20,000 of these entered the field since the war began.

Of the total number 30 per cent. are not fully skilled, that is, they are incapable of executing satisfactory welds on all metals, being mostly employed on sheet steel work for war purposes. The impetus that has been given under war conditions should stimulate employers at the conclusion of hostilities to investigate and exploit this revolutionary process, whose vast possibilities have no obvious limits.

In the shipbuilding trade this process can be utilized a hundredfold more than at present; for instance, in making of knee-brackets, stays, and frames, these can all be cut and welded by blow-pipes, with present costs reduced and output increased; a blow-pipe only requires one man, but an anglesmith when welding a knee-bracket requires two or three assistants.

This process is not being neglected in some works, and those who have grasped its possibilities consider it a unique labor-saving tool. In one locomotive shop where twenty welders were employed, and 6,000 feet of piping have been installed for carrying gases to all the shops, they have more than 400 locomotives in use with welded fire-boxes and 500 welded engine-frames, and they have reclaimed in one month 157,082 bolts, thus saving £400 compared with new ones. Repairs to shop tools, machinery, etc., are common, and excellent results obtained. The housing for a large roll was repaired by this process, welded in a day and a half; a new housing could not be obtained under six weeks. A planer broke whilst operating on a cylinder of an engine; a new part could not be got under ten days; but with the blow-pipe the part was welded, and the planer at work in two hours and forty-five minutes. These examples might be multiplied considerably.

Circulation and Piling in the Dry Kiln

A good dry kiln when empty may be a poor dry kiln when loaded with lumber, simply because the wrong method of piling is used. Circulation of air is necessary to distribute the heat and humidity uniformly to all parts of the kiln and to all parts of the lumber pile. In a kiln of good design the circulation is carefully provided for, but obstructions caused by improper piling may defeat the designer's plan.

There are few more effective ways of baffling circulation than by piling into the kiln a quantity of lumber across the path which it was intended the air should follow. If this is done, the circulation becomes sluggish and uneven, permitting the formation of cool pockets in which lumber does not dry and hot pockets in which lumber is ruined.

Air moves differently in different types of kilns; therefore the proper method of piling the lumber will vary with the kind of kiln used. To run lumber into the dry kiln endwise, or crosswise, or edgewise, without regard to whether the stickers are to be perpendicular or parallel to the direction of circulation, is a blind effort and not at all conducive to efficiency or satisfaction.

This point was brought very forcibly to the attention of the Forest Products Laboratory some years ago when a problem in the operation of a dry kiln of new construction and good design was presented by a large commercial concern. Although the new kiln was far superior to the old one when empty of lumber, in points of design and control apparatus, it dried lumber more slowly and less evenly than the old kiln.

The trouble was that the same system of piling was used in both cases, although the direction of circulation had been changed in the new kiln. The system of circulation in the new kiln was much preferable to that in the old, but the old method of piling, which was intended only for the old kiln, threw the balance the other way.

This experience led to careful tests, the results of which have very general and broad application in commercial practice. In a kiln having vertical-lateral circulation, such as is usually characteristic of condenser kilns and of many ventilated compartment kilns, lumber was piled both endwise and crosswise. A curtain was dropped from the ceiling between the two piles in such a way that each pile dried according to the same temperature and humidity. Temperature and humidity readings were taken daily, at different parts of each pile. On the eighth day, for example, the readings were as follows:

CROSS PILED LUMBER

Center of the pile	110° F.
Underneath	168° F.
Above	146° F.

END PILED LUMBER

Center of the pile	142° F.
Underneath	152° F.
Above	146° F.

The difference in temperature between the center and bottom of the first pile (cross piled) was 58 degrees, while in the second pile (end piled) the difference was only 10 degrees.

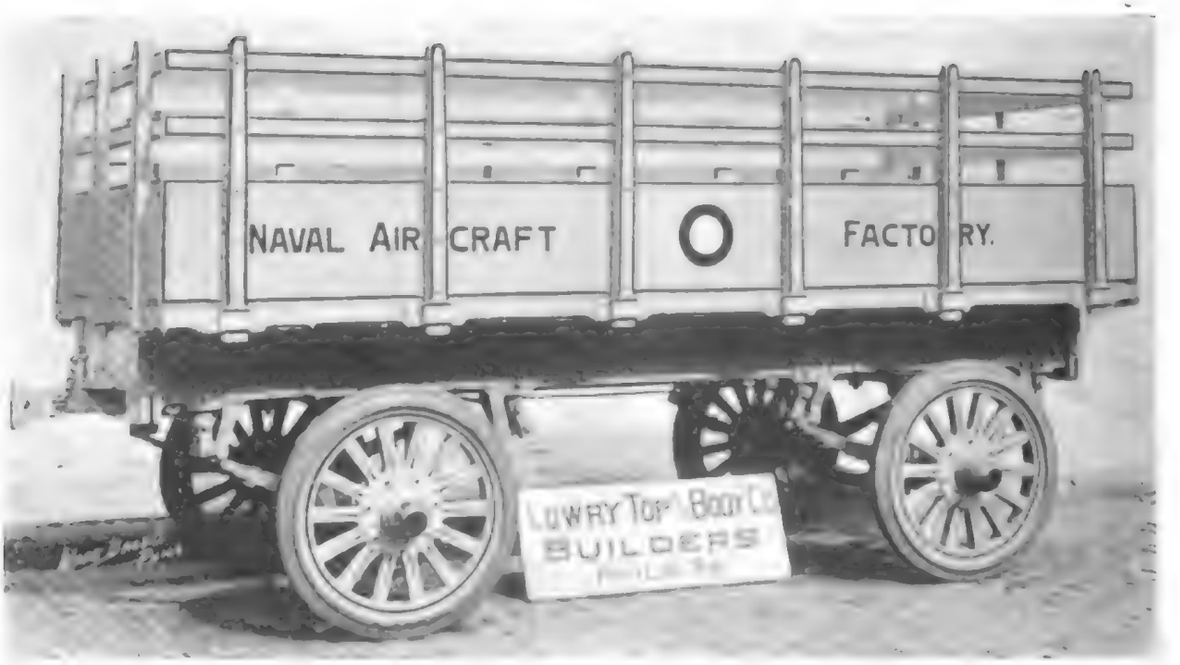
Naturally such differences in temperature at various parts of the piles had a decided effect on the rate and uniformity of drying. The end piled stock dried in 10 days from a moisture content of 30 per cent. to a maximum moisture content of 6 per cent. The stock piled crosswise took 13 days to dry from 30 per cent. down to 12 per cent.

The lesson is obvious. Lumber should be piled to suit the circulation in the kiln

Tar Comes With Spring

Like the bluebird, spring has brought with her the road repairman and his bucket of tar. While it undoubtedly improves the road, it does not add to the appearance of the automobile. However, tar can easily be removed from the machine without injuring the finish if one of several good tar removers now on the market is used for the purpose. It is well to add a few cans of this tar cleaner to the equipment of all garages and paint shops. Have it on hand when it is needed.

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TRAILER BODY MOUNTED ON A FOUR-WHEEL WAGON GEAR.
Body built by Lowry Top and Body Co., Philadelphia, Pa.



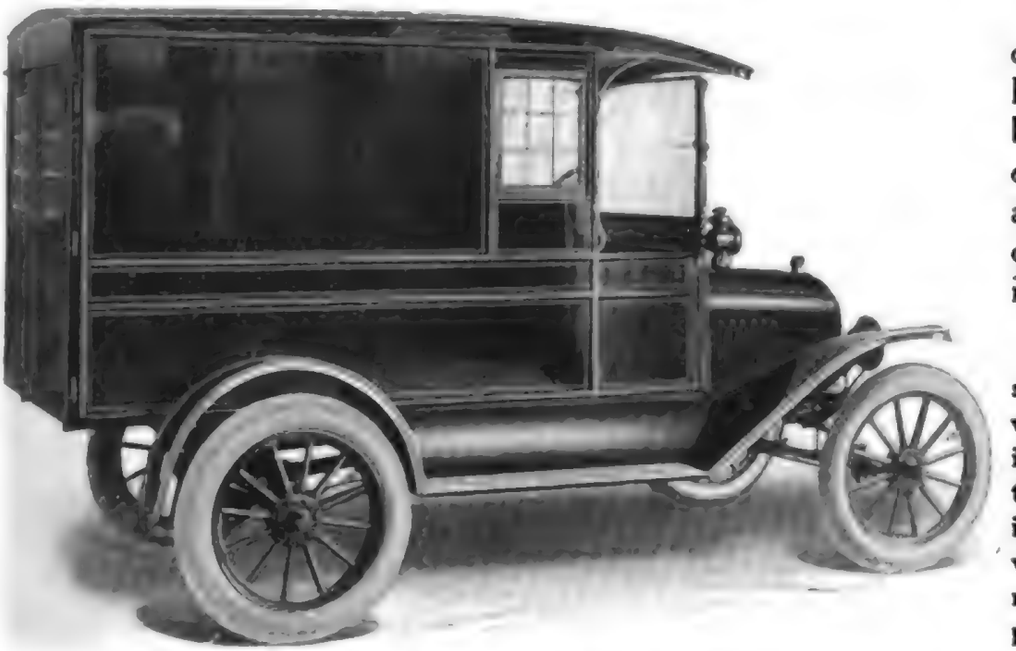
INTER CITY TRANSPORTATION BODY, WITH CLOSED CAB, DOUBLE SIDE AND REAR DOORS.
Body built by Lowry Top and Body Co., Philadelphia, Pa.

TWO VEHICLES THAT HELP TO SOLVE THE FREIGHT TRANSPORTATION PROBLEM

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BODY DEPARTMENT

VEHISOTE side panels consist of one large sheet of VEHISOTE, crackless—jointless—flawless. The checking and blistering, the gapping seams which are so unavoidable in wooden panels, are impossible with this impervious one-piece material.



There are now over 60,000 VEHISOTE paneled bodies in service, each panel speaking a good word for the quality and durability of VEHISOTE.

It is not a substitute for wood in vehicle body building. It is a scientific and positive improvement over wood or any other material for the purpose.

It is as far ahead of old-fashioned methods as the gasoline or electric truck is ahead of horse-drawn vehicles.

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N. Langler & Sons, Brooklyn, N. Y.
H. D. Taylor & Co., Buffalo, N. Y.
W. E. Kleine & Co., New York City
H. Hett & Sons, New York City
W. T. Crane Cge. Hdwe. Co., Newark, N. J.
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Motor Bodies and Parts

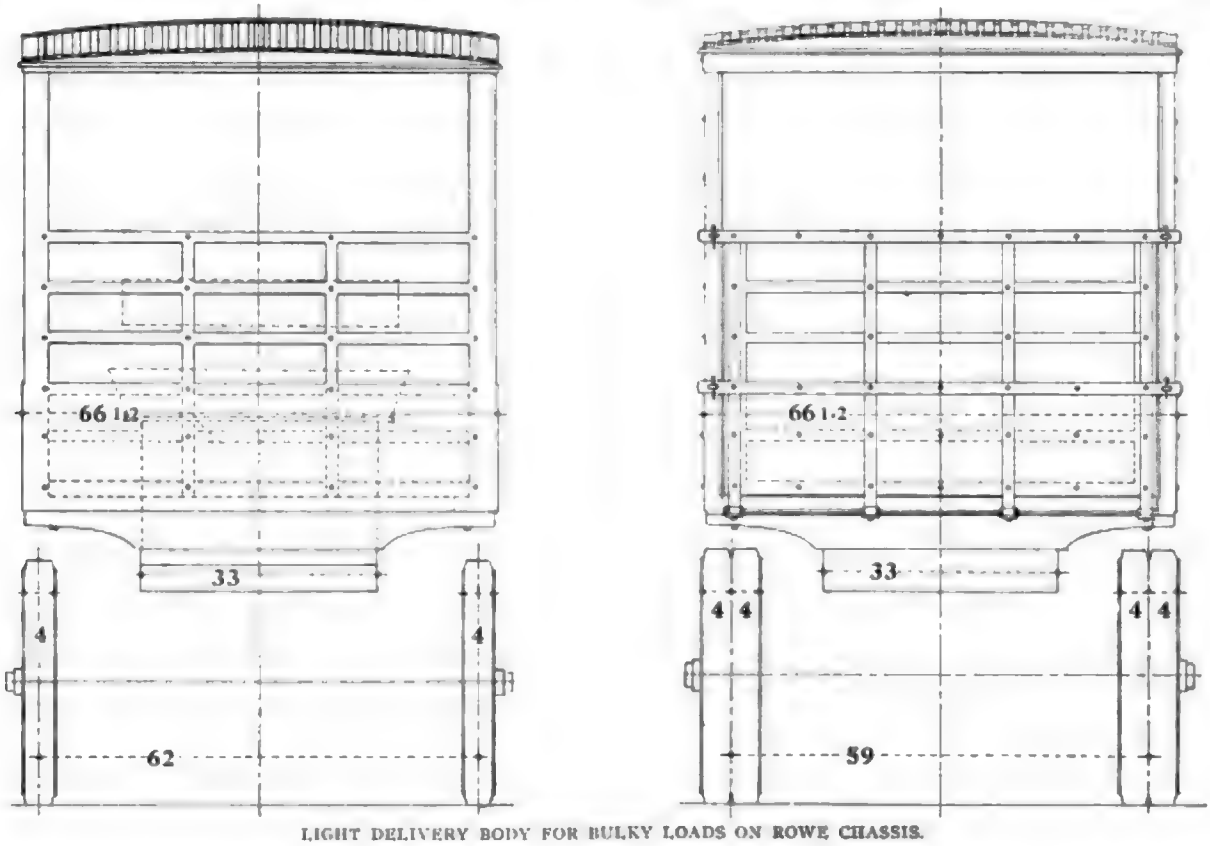
Light Delivery Body for Bulky Loads

This light delivery body is fitted to the Rowe Motor Company's model C. D. W. 2½-ton truck chassis, dimensions of which will be found on page 29.

obstruction in loading and unloading heavy cases. This same objection can be made on freight route body with cab, illustrated on pages 27, 28 and 29, of our May, 1919, issue.

made ⅞ x 1¼ inches and let into the boards, which would leave ⅞ inch if ¾-inch thick boards are used, which is sufficient not to impair the carrying capacity of the body.

On this working draft another system is used, shown on rear end of side elevation. A



LIGHT DELIVERY BODY FOR BULKY LOADS ON ROWE CHASSIS.

The Construction of the Body

The body differs somewhat in its laying out and construction from those we have heretofore described and illustrated.

Complaints by transportation companies often have been made that cases and goods, in loading and unloading, are damaged on account of the uneven inside surfaces so often seen in body construction. For instance, when the tailgate is lowered to a horizontal position it stands ½ to 1½ inches above the cross bar, and the result is that when a case or box is moved toward the rear end of the body it will strike the lower edge of the gate. If the case is heavy, with two or three men back of it pushing, the pressure may dislodge the gate hinges.

Another complaint is about the iron stays used to strengthen the sides of the body. These stays are made ⅞ to ⅝ inch thick, and ¾ to 1½ inches wide, and are a very serious

On this body the inside surfaces are perfectly smooth, with the exception of the inside braces, which are ⅝ x 1¾ inches, to strengthen the posts and sides of body. These braces are objectionable to the managers of the transportation companies, as it is so difficult to avoid collisions with them in loading and unloading, and damages to the goods are sure to occur.

It is our opinion that this objectionable feature can be avoided by routering the ⅞ or 1-inch thick boards the thickness and width of the braces. For instance, on the freight route motor body, as published in the May issue, there are twelve iron braces, six on each side. This body has side doors and the boards which close the sides, front and back, are ⅞ inch thick. The door post braces could be made ⅜ x 1½ inches, let into the boards ⅜ inch, leaving ½-inch support on the posts. The other four braces, each side, could be

represents the ¾-inch thick side boards; B, C, D, E, F, G represent the side rail; H, the posts and K the iron braces. The rails, B, C and D, are let in from the inside, instead of from the outside, as always has been done in wagon body construction, and the inside surfaces of rails are level with the inside surfaces of the iron braces. The rails, E, F and G, rest against the side boards and are bolted through side boards, rails, posts and iron braces.

This system strengthens the side boards and at the same time creates surfaces level with the iron braces. The corners on the iron braces are let into the sills, level with top surface. The upper rails, B, C and D, are let into the posts same as E, F and G.

In Fig. 1 we give the thicknesses of rails, iron braces, side boards, sills and position of

(Continued on page 29)

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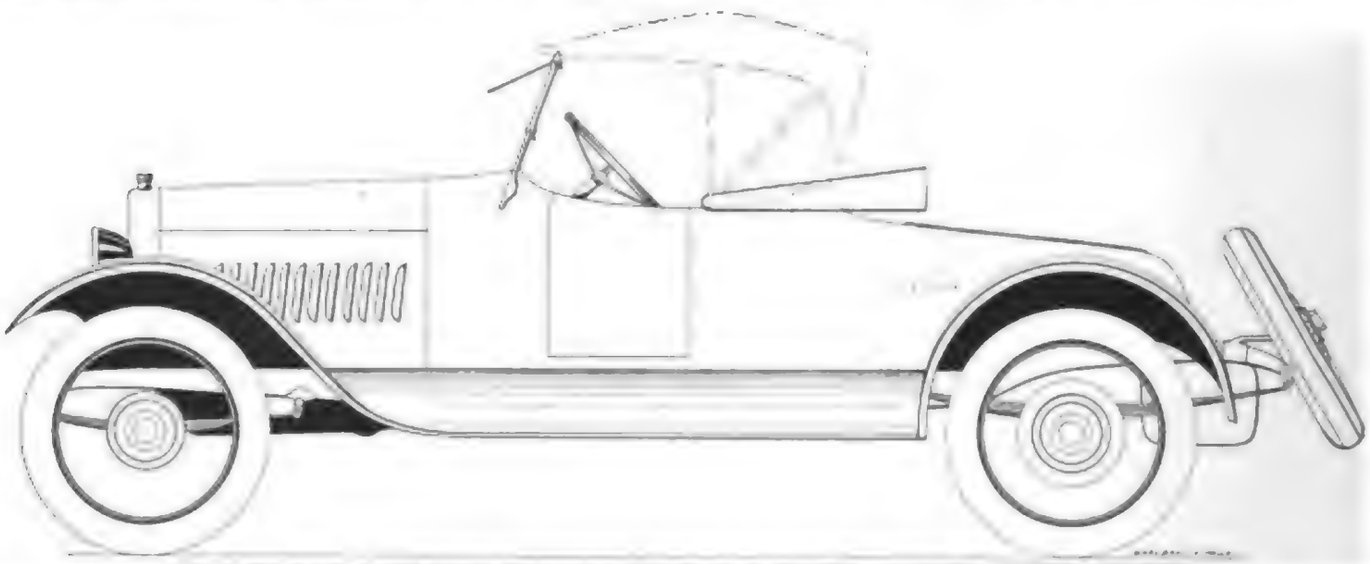
Runabout Body Mounted on Chandler 123-inch W. B. Chassis

By GEORGE J. MERCER

The runabout body has a well-merited place in the estimation of car owners because it adequately fulfills a dual duty, when it is like the design illustrated.

Because a man owns a car, it does not follow that he wants to carry all the people his car can accommodate, yet he probably will need space at times for more than two, and the runabout with comfortable, folding concealed seats at the rear, is the ideal type for many people.

The design illustrated is mounted on a Chandler 123-inch wheelbase chassis, having the accepted left-hand drive, center control, with gasoline tank and extra wheel at the rear.



RUNABOUT BODY, MOUNTED ON CHANDLER 123-INCH W. B. CHASSIS. GEORGE J. MERCER, DESIGNER.

The illustrations are very comprehensive and comprise the fully detailed working drawings, together with the picture of the completed car. All are drawn to scale and the details of the fixtures, showing how the folding seats at the rear are operated, make this set of illustrations complete for manufacture, according to the method employed in custom shops.

It has been possible with this design to retain the standard engine hood, fenders and tire carrier. We think less at the present time of retaining any of these fixtures, because the body design is paramount and the additional cost of making replacements is secondary to the carrying out of the body lines to their logical end and getting the appearance desired. But if it is possible to retain nearly all the chassis equipment, it is certainly desirable and economical.

The picture shows the car complete, with the top folded and the extra seats closed. This view is generally all that the average customer wishes to see before making his purchase, because the design must fall or stand as a complete assembly. The benefit of showing the detail construction, however, is that the common sense and practicability of the design can be demonstrated and proved.

Very little is left to experimenting as far as proportions are concerned, such dimensions as the space between the wheel and seat back and cushion, depth of cushion, space between the door post and wheel for comfortable entrance and height of seat back are standard, and any builder who departs very far from common practice is bound to have his customer see the difference when he makes comparisons with some other car. Different combinations or lines, however, giving a different exterior appearance, are always within the rights of the builder, and it is the aim of every builder to have distinctive lines to make his product attractive. At the same time we are all constrained by the prevailing fashion or style and radical things are not easily sold.

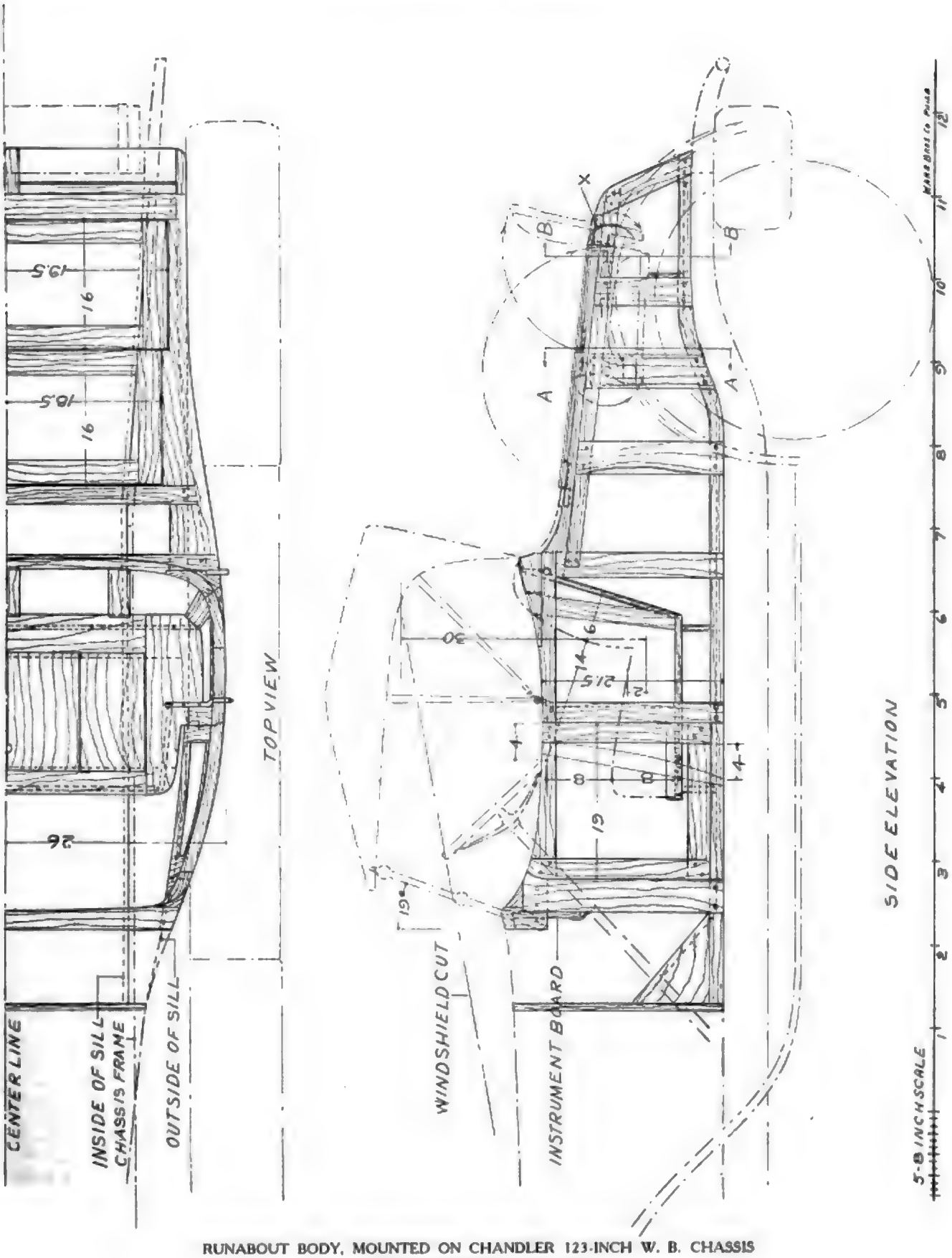
The illustrations, giving the details of construction, represent the side elevation, top, front and rear views, and the two sectional views. These views are all made showing the skeleton framework only, to better facilitate reading the drawings. The two sectional views, however, are complete, so that a better idea of the manner of assembling can be conveyed.

The side elevation has a few dimensions in figures, but the bulk of the sizes of the material, etc., will have to be taken from the drawing by aid of the scale. Sizes of stock are about the same in all shops. No one wastes stock heedlessly, and the scaling of the drawing for sizes will be ample. The doors are hinged at the front, concealed hinges being used, and therefore the body hinge pillar is shown, 3½ inches wide, to give strength for the cutting away for the hinge, which is nearly two inches in depth. It is not intended to use moldings on the doors; the panel extends so as to cover the opening, and this can be either flush or set out for an overlap. Either method is quite right, but the flush door is the best looking, although the most expensive. The methods of making these types of doors is pretty well understood. It is simply to place at the edge of the doors a strip of metal plate about 1¼ inches wide of 19 gauge, and nail this to the wood, allowing it to project over the edge as far as the opening to be covered requires. The panel is then put on over this and the edges wrapped over the plate and back on the inside, the plate being sandwiched between. It is the same for the overlap or the flush door, the difference being in the body pillars. For the flush door there is a rabbet all round to receive the door. A sectional view of the door pillar, showing the turn-under, is illustrated in the door space; the door locks have their handles on the inside.

On this view are illustrated phantom views of the chassis frame, fender, steering wheel, top and windshield. The latter is slanted 19 degrees from the perpendicular. The seat cushion and back are outlined in the same manner.

The operation of the concealed seats is also illustrated on this view. The line of travel is indicated by the arrow marks and on the top view are shown the sizes on the openings. It will be noted that the rear lid, forming the back, is one inch wider each side than the front one. This is so made to allow the front one to pass easily through the opening of the rear one. This front lid forms the cushion, as illustrated on the side elevation, and the front end is supported by the fixture on which it revolves, while the other end rests on the board at the back of the rear strainer.

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RUNABOUT BODY, MOUNTED ON CHANDLER 123-INCH W. B. CHASSIS

(See Description on page 26)

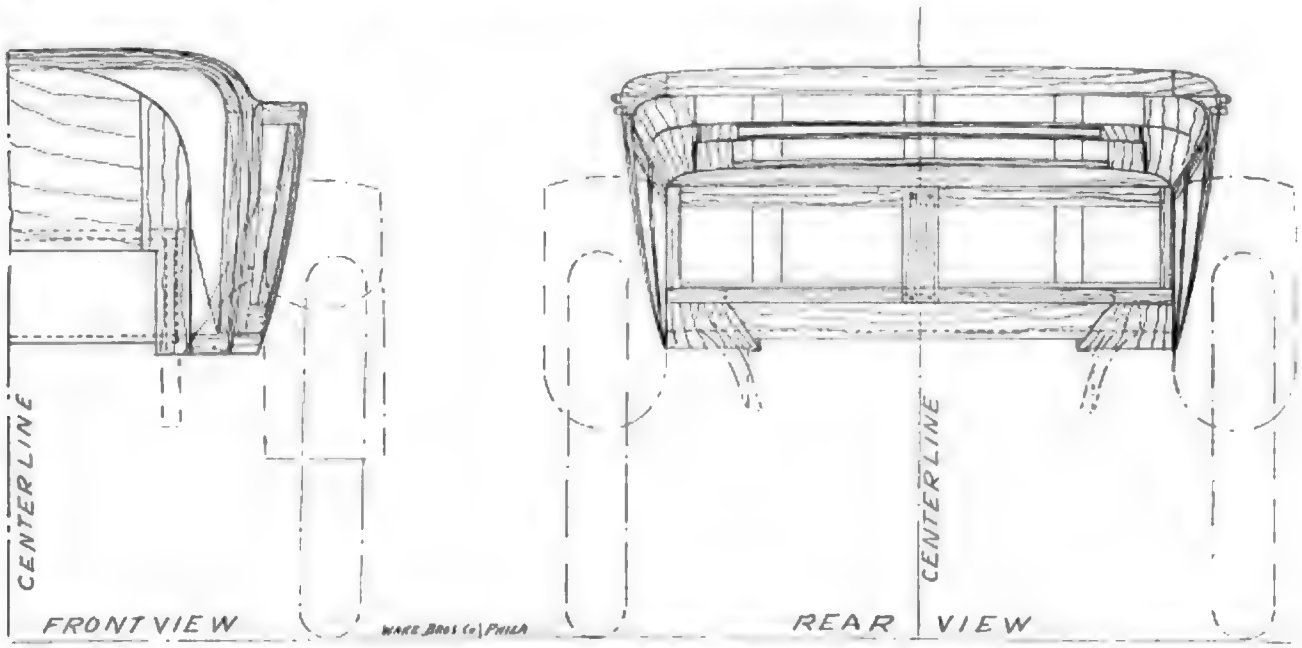
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It will be required to place small bright finished plates outside the panel of the lid to protect the paint surface and to act as rest points for same. The rear lid forms the back. Ordinarily this lid has simply a hinge at the line of cut that raises the lid up its full length above the deck. This makes the back look too high in relation to the other seat. Therefore, this design shows a fixture below the top, similar to that used for the other lid, and this brings the back lid down into the well as shown. The only disadvantage of this arrangement is that the arc marked X will be the termination of the metal plate on the sides that help to keep out the water when the lid is closed. The molding over the edge, and which is fastened to the lid, will have to be filled out to give the appearance of carrying this plate along. In reality the opening will have to be just a trifle wider in the well from the line X back, to permit the lid to pass down; and the provision for taking care of the water that enters will have to be made by a drain inside that will carry off the water through a center pipe down below the floor. The advantage of this form of fixture is that it is stronger than the ordinary top hinge, and a suitable stop can be located on the lid and the back of the well opening, so that the paint surface is well protected.

The rear and front views explain themselves, and the two sectional views A-A and B-B are made double size and show the form of fixture used. Dimensions of the length of these are given in figures, but it is always better to lay these out for each draft on the full-size drawing itself. To have the lids clear nicely is the test, and as these fixtures cannot be purchased, but must be made up special, the thickness of stock and curvature of the deck top-sweep will both enter into determining the actual length.

The lids are made with "tee" molding on the edges. The back lid will not have this molding on the back, but the lid itself fits tight to the opening and, as it is one-quarter inch above the deck panel, the lid being rounded down to this line, will carry off the water at this point.

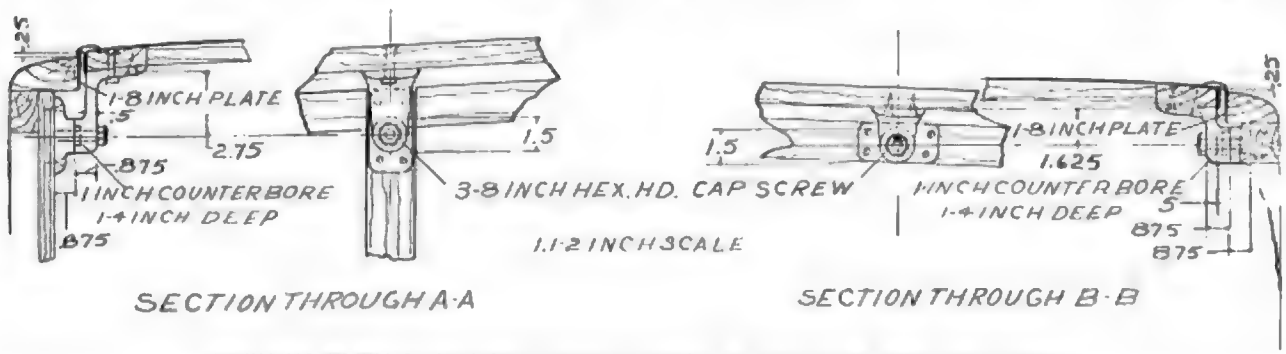
Neither is there any metal plate on the body bar at this place, but on all the rest of the opening, except the sides from X back, there is a plate extending one-quarter inch above the deck panel, and the "tee" molding on the lids fits tight to the top of this. The lids are locked by spring box locks, one each side at the forward end of the rear lid, and a concealed keyhole plate covers the handle hole.



FRONT AND REAR VIEWS OF RUNABOUT BODY ON CHANDLER 123-INCH W. B. CHASSIS.

The panels used can be either steel or aluminum. For a single job aluminum is most suitable, as it is more easily worked and the difference in the cost of the metal is more than offset by the extra labor when steel is used for one job. To facilitate the metal work on the deck, a molding is carried down to the rear bottom end, and up to the top of the seat, corresponding to that used to cover the well opening on the lids on the sides. Deck and side panels are joined under this.

Ash framing is best to use throughout. The windshield is two-piece and mounted outside the panel as illustrated. The cut in the windshield is given as the height of the eye when the cushion is depressed two inches, so that clear vision is had over the top of the radiator.



SECTIONAL VIEWS OF RUNABOUT BODY THROUGH AA AND BB OF DRAFT ON PAGE 27.

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Gilding and Gold Size

By A. J. Mossow.

The question has often been asked: "What kind of gold size do you use?" Which, after all, depends on the kind of work or surface on which you are gilding and whether the surface is to be varnished or not. Gilding on wagons or automobiles, whether striping or lettering, is best done and more durable with Japan gold size. There are a number of brands on the market and all very good, but their efficiency and durability are increased when a slight quantity of finishing varnish is added, which lengthens the time of drying out, makes a solid gild and a higher burnish. It all depends on the amount of work to be done how much varnish you should add.

Should the job require two hours in which to size, make the mixture one part finishing varnish to three parts of Japan gold size, so you will not have long to wait to lay the gold leaf. Should the gilding be for outside work, which is not varnished, the size should be one part Japan gold size, two parts finishing varnish and one part fat oil. A small portion of medium yellow in oil is usually added to give it a body and to form a ground for the gold. This mixture will require from 24 to 48 hours to set properly before laying the gold, depending on the temperature and weather conditions, and makes an excellent gild with a very high burnish that will wear for years, even when exposed to all kinds of weather and to all seasons of the year.

National Shows of 1920

President Charles Clifton, of the National Automobile Chamber of Commerce, has appointed the following as a show committee for the 1920 passenger car shows: John N. Willys, chairman (Willys-Overland); H. G. Root (Westcott); H. M. Jewett (Paige). The committee on motor truck shows consists of M. L. Pulcher, chairman (Federal); A. J. Whipple (Diamond T.); David S. Ludlum (Autocar).

Light Delivery Body

(Continued from page 25)

joints, full size, with dimensions for each part, including the joints.

The side rails, back of the side boards, are glued and screwed and blocked from outside of side boards. The side boards are glued and screwed against the sills, and blocked. These sill joints are supported by the inside rails, and at the same time increase the carrying capacity.

There are 5½ inches space between rear tires and the point indicating the depth of the cross bars, but as the bottom boards rest on the eleven cross bars, they must be 6½ inches deep, as shown on side elevation. The top rails are ¾ inch thick and rails inside are let into the pillar same as those below. These rails are 1 inch above the lower edge of top rail, which is filled up with a key, 1 x 1¼ inches, to secure the curtains to the top rail. The top is covered with ⅛ x 1½-inch strips, 1 inch apart and covered with imitation leather. Edges are covered with the drip moldings.

The front of body is finished same as the sides, except the pillars are heavier, as shown on front elevation.

The rear drop gate is 38½ inches high and

Spring Dimensions, Front

Length center to center of bolts	41 inches
Width across leaves	2½ inches
Number of leaves	9
Combined thickness of leaves	2⅜ inches
Width across center to center	31 inches

Spring Dimensions, Back

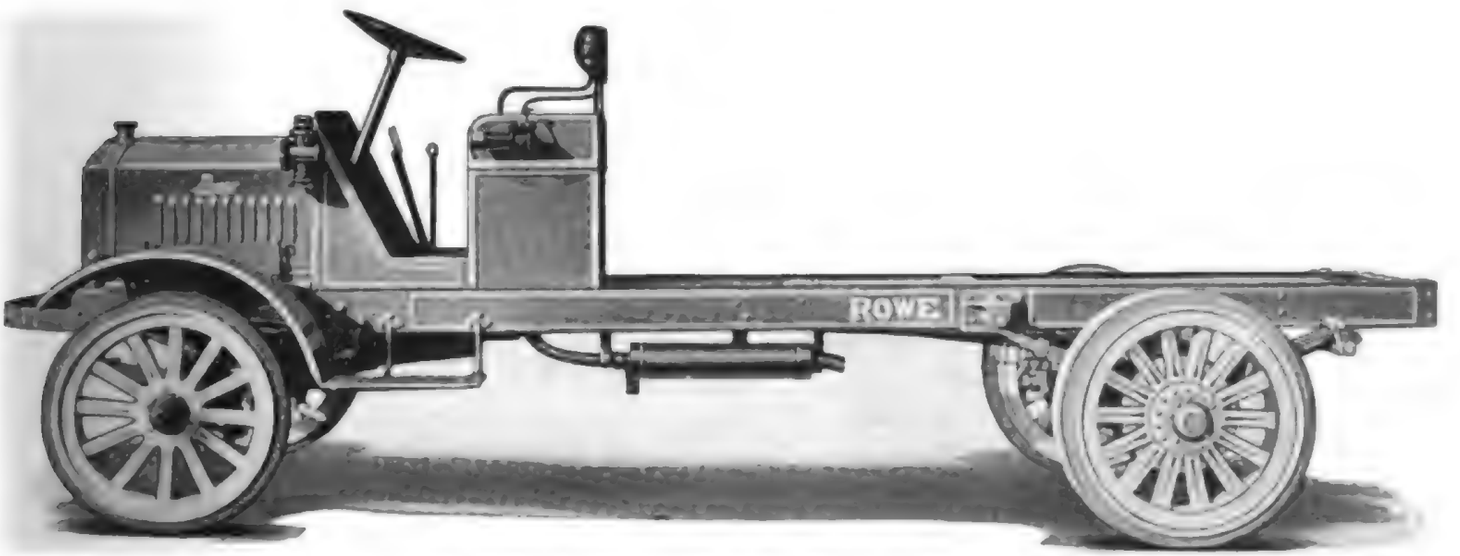
Length center to center of bolts	50 inches
Width across leaves	3 inches
Number of leaves	14
Combined thickness of leaves	4⅞ inches
Width across center to center	39 inches
Width across the frame, front and rear	33 inches
Diameter of wheels, front and rear	34 and 36 inches
Width of tread, front and rear	62 and 59 inches
Size of tires	4 inches front and 4 inches dual rear

Lengthwise Dimensions of Chassis

From rear of dash to rear of seat	42 inches
From rear of seat to center of rear wheels	103 inches
From rear of seat to rear end of frame	107 inches
Length of wheelbase	164 inches
From rear of dash to rear end of frame	189 inches

The Lengths and Heights of Body

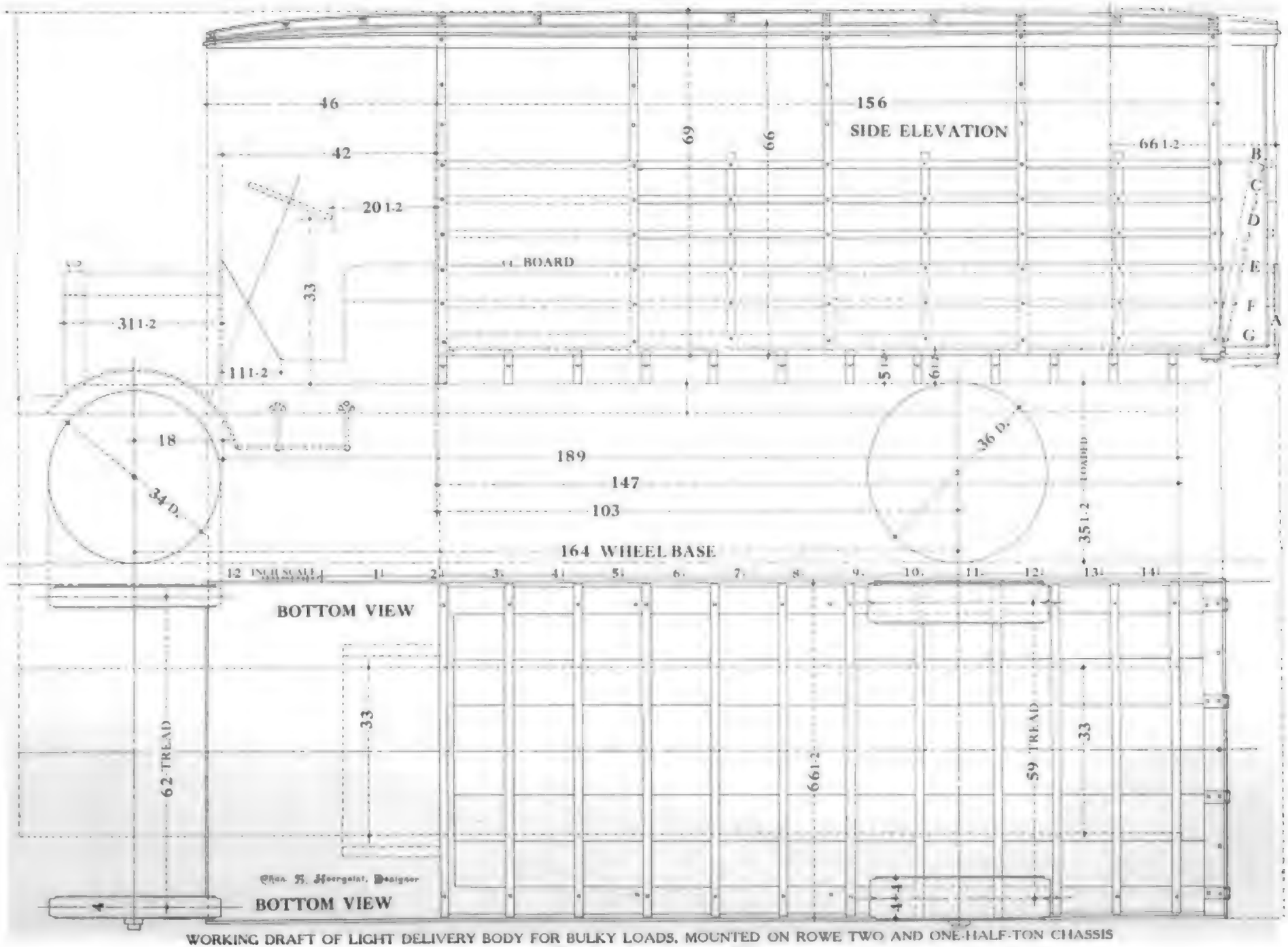
Length from front of top rail to front post	46 inches
Length from outside of posts, 13 feet, or	156 inches
Height from under surface of sill to outer edge of top rail	66 inches
Height from under surface of sill to outside of top at center	69 inches
Amount of curve across the top	3 inches



SIDE VIEW OF ROWE MODEL C. D. W. TWO AND ONE-HALF-TON TRUCK
Made by The Rowe Motor Co., Lancaster, Pa.

ALL ROWE TRUCKS ARE FURNISHED WITH A STRONG RADIATOR GUARD, WHICH IS NOT SHOWN IN ABOVE CUT.

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WORKING DRAFT OF LIGHT DELIVERY BODY FOR BULKY LOADS, MOUNTED ON ROWE TWO AND ONE-HALF-TON CHASSIS

(See Description on page 25)

Number of Pieces, Sizes and Kinds of Timber for Light Delivery Body

The Main Body

No. of Pieces	Kinds of Timber	Thickness Inches	Width Inches	Length Ft. In.
2 Main sills	Oak	1¼	5	13-
1 Front end cross bar	"	1¾	3	5-2
1 Rear end cross bar	"	2¾	4	6-8
1 Frame cross bar	"	1⅝	5½	6-8
11 Frame cross bars	"	1⅝	6½	6-8
6 Bottom boards	"	¾	10	13-

Board and Cross Rails Across Front

1 Board on lower part of body	Ash	¾	18	6-6
1 Lower cross rail	"	1¼	1½	6-6
5 Cross rails	"	1¼	1½	6-6
1 Front end cross rail, curved	"	1½	3½	6-6
6 Top curves	"	1¼	1¼	6-6
4 Top curves	"	1⅛	1⅛	6-6
1 Rear end cross rail	"	1½	6	6-6

Side Boards, Side Rails, Top Rails

2 Side boards	Ash	¾	18	13-1
2 Lower side rails	"	1¼	2½	13-
5 Side rails	"	1¼	1½	13-
2 Top rails	"	¾	5	17-
2 Inside top rails	"	1¼	1½	17-
2 Upright front posts	"	1½	3½	5-7
8 Upright posts	"	1⅛	1⅛	5-7

The Drop Gate

2 Side pieces	Ash	1½	3½	3-4
2 Center pieces	"	1½	1½	3-4
1 Lower cross rail	"	1½	1½	3-4
5 Cross rails	"	1½	1½	3-4

Body Irons

6 Corner top rails	1 x 6 inches
8 Post braces	⅜ x 1½ inches
4 Gate hinges	⅞ x 1⅜ inches
4 Inside gate hinge plates	⅛ x 1¼ inches

its construction is same as the sides of the body with the exception of the inside braces. Instead of the braces, there are ⅛ x 1½-inch plates, and on outside there are four hinges, ⅞ x 1¾ inches, supporting the gate lengthwise when open.

To support the gate (across) there are two irons. One is secured to the outside of upper rail with its end extending each side of gate to fasten it when closed, and to hook the chain in when open. Another such iron is at the top edge of side boards, also supported by a chain when open; that is when in a horizontal position. These four chains, four hinges and two cross stays will prevent the gate from sagging, as is usually the case.

Welding Sheet Aluminum

Sheet aluminum is as a rule pure metal and has to be handled somewhat differently from an alloy. Where welding has to be done, the sheets are very rarely over ⅛ inch in thickness. If they are, they can be welded in the same way as a casting, except that pure drawn aluminum rod must be used as a filler and *sheet aluminum flux* used.

Pre-heating is seldom necessary and any reheating or annealing that may be deemed advisable along the line of weld can be done with the blow-pipe flame, using a slight excess of acetylene.

Beveling of the plates before welding has hardly ever to be done, and practice will show that the plates tend to bevel themselves as they come up to the melting point along the line of weld.

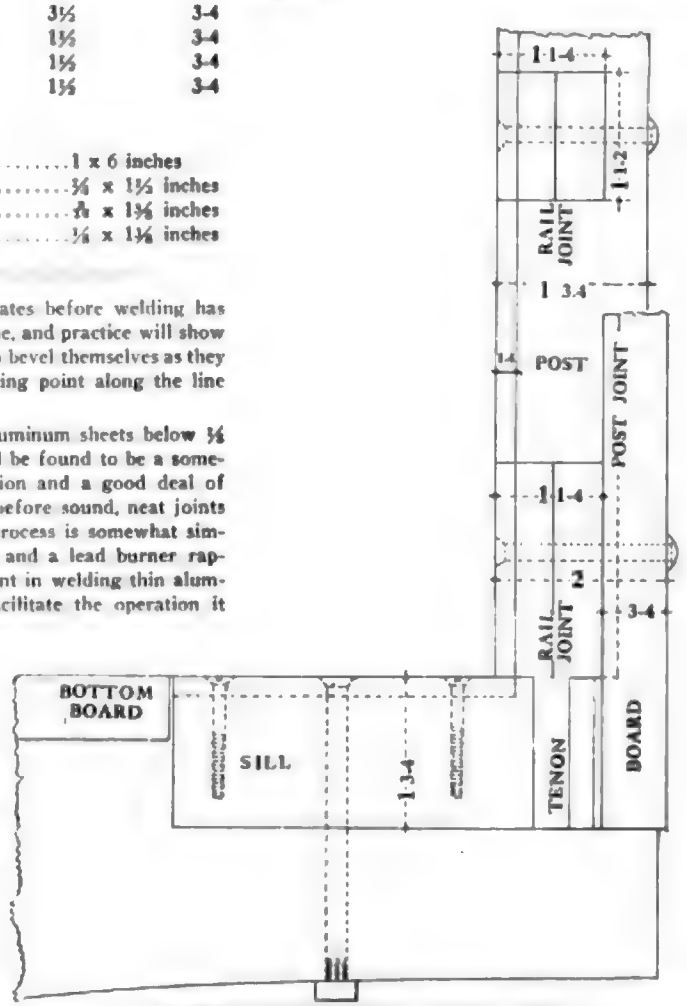
The welding of aluminum sheets below ⅛ inch in thickness will be found to be a somewhat delicate operation and a good deal of practice is required before sound, neat joints can be made. The process is somewhat similar to *lead burning* and a lead burner rapidly becomes proficient in welding thin aluminum sheets. To facilitate the operation it is desirable to use a light blow-pipe, using a No. 2 or No. 3 tip. Sheets between ⅛ or 1/16 inch need not be beveled or flanged. Sheets ⅛ inch thick and under should be flanged to a height of one to one and one-half times the thickness of the metal. Clean the work thoroughly and leave it bright along the line of weld. Regulating flame to right heat depends mostly on the knowledge of the operator, and the metal. It depends largely on the thickness and quality of metal.

A usual practice is to employ a 16-gauge aluminum; four to 5-pound pressure oxygen, and eight to ten acetylene. On 20-gauge steel, two to four pounds oxygen and four to six pounds acetylene.

Rubber Products Co. Expanding

The Rubber Products Company is materially increasing its manufacturing and storage space at the Barberton, Ohio, factories. Additional office space is also planned, all this being needed to care for the rapidly developing business in Stronghold tires and tubes.

Steward Slosson, well known in rubber circles, has been appointed Pacific Coast manager and took up his new work on the coast May 1st.



LIGHT DELIVERY BODY FOR BULKY LOADS.

The above draft shows the dimensions for sill posts, rails, sideboards and iron braces. The drawing is on a scale of one-half.

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Painting and Finishing

Some Essential Color Definitions

Hue is that characteristic of a color which distinguishes it from any other color. It has been determined that the primary colors, red, yellow and blue, have no established hues, tints, or shades, but in every compound of the primaries a hue is discernible. Green, for example, as a compound of blue and yellow, can be made to greatly vary in hue as the proportion of one primary is increased and the other reduced, and *vice versa*.

The predominating primary in any compound of the primaries fixes the hue thereof. This leads some authorities to say, and we believe correctly, that hue may be a mixture of two or more colors of any order, but the mixture should not depart considerably from the original color.

Practically, then, hue is color, and it matters not whether it is a combination of two or more primaries, or something which distinguishes it from some other color. The main thing to establish is the fact that hue may properly be termed color, however much the definition may become entangled in a web of technical description. It remains the same when it becomes the result of mixing two or more colors or pigments together.

Shade is that property of a color resulting from the addition of black to the color. That is a simple thing to remember in connection with adding black to a hue or color.

A tint is produced by adding white to a color. To better illustrate this definition proceed to add flake or Florence white, or any good grade of white, for that matter, to chrome yellow, and as the additions are gradually made a long list of tints are produced until the chrome merges into the original white. In brief, then, dilute any color or hue with a lighter color and the result is a tint of that color or hue.

The tone of a color, or tonal effect, is that property which measures the depth of the color or hue. Positive colors, concerning which much confusion reigns at times even among the very elect, are pigments which contain no white or black by mixture; negative colors, on the contrary, do contain white or black, or both.

It is self-evident that by adding black to a color we may develop many different shades of the color, and in quite the same manner by adding white to a color an equally numerous list of tints may be produced.

As mentioned above, the primary colors are red, yellow and blue; the secondary colors are green, purple and orange; the tertiary colors are russet, citron and olive. In our observation of these colors it has been found that carmine, ultramarine blue and lemon yellow very closely approach the prismatic colors. Accepting them as primary colors, it is determined that in proportional strength they rank as follows: Yellow, 3; red, 5; blue, 8.

It is interesting and useful to note that to form the secondary colors, green, for the first example, it requires 3 parts of yellow and 8 parts of blue. Remark, in this connection, that green is the contrasting color to red. Also, remark, that the contrasting primary is not in any least part represented in the secondary. Purple, the contrast to yellow, contains 5 parts of red and 8 parts of blue. Orange, the contrast to blue, contains 5 parts of red and 3 parts of yellow.

To make this plainer to the reader, and to help him, if possible, in securing contrasting and harmonizing colors for use in his work, we here give a table of the primary, secondary and tertiary colors:

Primary Colors	Secondary Colors	Tertiary Colors
Red	Green	Russet
Yellow	Purple	Citron
Blue	Orange	Olive

Please observe from this table that any color in the secondary column opposite a color in the primary column is the contrasting color to that primary, and in the tertiary column, the tertiary opposite any given secondary color may be accepted as the harmonizing color to that secondary's contrasting primary color.

To illustrate: Red the primary has green as its contrasting color and russet as its harmonizing color. Orange is the contrast to blue and olive harmonizes with blue.

How are the tertiaries to be made? Simply by uniting the secondaries in equal proportions, or by combining the primaries in the proportion of two parts of any given primary and one part each of the remaining primaries.

An example: Olive may be made by combining purple and green, both secondaries. It may also be made of the primary blue, two parts, and one part each of red and yellow.

By carefully learning the combinations which may be effected by the use of these primaries and secondaries and tertiaries the list of combinations of contrasting and harmonizing colors may be greatly expanded and made more useful in the actual work of the shop. It will enable one to make many changes in color harmony concerning which the complaint is often heard that it is too inflexible. To cite an example: Any one color of any of the three orders will harmonize with the colors which contrast with the remaining two colors of the same order. With this rule almost endless combinations may be worked out to great advantage.

Facing Up Coats for the Truck

These consist of priming or first coats, filling up coats, and surfacing applications, all working for the one prime essential, to wit: a finish satisfactory to owner and painter alike.

In the case of new work or over old paint surfaces, the first coat should be of a nature to take strong hold of the surface, and while yielding capital surfacing advantages have the capacity to hold on like grim death to the surface beneath and give safe harbor to the coats coming after it.

Are you using a material after this fashion for the first coat? We shall not attempt at this time to influence the reader in favor of any particular material for the first coat; suffice it, that it is made of ingredients of the best sort, and combined in proportions to furnish the best possible results. For the next coat nothing less masterful in the way of qualified stock and mixing will pass muster if the painter is alert.

This second coat, for one thing, should have unsurpassed surfacing properties; fine of texture to reduce the labor of fetching down to the right degree of surface fineness. In this rubbing and sandpapering down care must always be had for the corners and sharp edges of the surfaces, of which there are many.

In a word, the warning may be here given: "Keep off the edges when rubbing or sandpapering." This will render big help in making all parts yield an equal amount of wear and protection. That as a rule the workman is careless in this matter of keeping off the sharp corners is evidenced by the way the finish goes off these parts once the vehicle gets out in the hardships of service. And when there is a break in the finish at these points the moisture and the air filters under the film of paint and introduces a welter of moisture which in turn produces corrosion.

From this stage it is only a short shift to an early decay of the finish and a flanking of the paint and varnish structure. This is the reason the painter invariably cautions against cutting the paint from the edges of the surface, and why he urges, on the contrary, that all possible bulk of material be left on these parts. He knows from experience that at best the film at the edge of the surface will be thin as compared to that at other points of the surface.

On all these vehicle bodies and parts it is necessary that a stout body of material be developed for the good of the vehicle, not to mention the advantage of appearances. And this body will need to be welded and fashioned in the finest manner possible to serve the purpose it is intended to serve.

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Varnishing Truck and Delivery Vehicles

On many if these vehicles it is quite as necessary to flow as deep and fine a body of varnish as you commonly think the pleasure car should have. Where the surface is broken up considerably the work to bring out the varnish coats in their full luster and depth of body is not so complex nor difficult, but when the surfaces are far flung, with much cut-up work, the job of getting a heavy flow of varnish correctly in place, is not an easy one. As a matter of fact, it requires a fine balance of skill in the art of handling varnish, to get all the coats correctly in place and looking every inch like royalty itself.

Many of these business vans and vehicles must carry a finish second to no class of cars, and in order to make them do this the work of taking care of the varnish coats will need watching from start to finish. As in the pleasure car field, the finish, to be made all that folks in general expect that it should be, will require a base as fine and smooth and clean as careful workmanship can make it.

This calls for color coats laid clean and smooth; for all the processes worked out to perfection, if such a standard be attainable. Then for the first coat of varnish, which must come in the form of varnish-color, we will need to have clean-cut brush work absolutely free from runs or sags, etc., but showing a heavy flow of varnish; this last-named feature being necessary for all classes of varnished work.

It never profits one to try and get a satisfactory finish with thin, skimpy coats of varnish, for this is impossible. What we get in the way of depth of brilliancy, wear and tear, and all the manifold virtues coming along with a structure of varnish, must first be established through the resources of successive coats of heavily flowed on material, and no vehicle is more in need of this very structure of varnish than the commercial truck or business van.

The first coat of varnish-color will need only a light rubbing down with a thin piece of felt held close to the surface and worked just enough to break down the gloss and level somewhat the inequalities.

And above all, keep off the corners and edges of the surface. Such parts will not require smoothing down; they will take care of themselves and show a finish perfectly in keeping with the remainder of the surface.

The second coat of varnish will stand a little more rubbing and should have it; indeed, this coat will take more than any of the other coats. The third coat, so-called, will need only what may rightfully be called a medium refinement; that is to say, an easy rubbing that will fetch down the luster of the varnish and bring out some of the finer features of surfacing, chief among which is the leveling up of the surface and making the hills and hollows disappear and an absolutely level effect take their place. That, in a word, is the sum of the whole matter in surfacing with varnish. It is much simpler, too, than it would appear from the text, the main thing being skill and experience.

In rubbing varnish all operations should be thorough enough to take off and lay down motes and particles of dirt which collect from coat to coat. Perhaps of all coats which must find a place upon the surface to bring forth the finish, the finishing coat is the most difficult and exacting to get in position and have it look at its natural best.

With the final coat of rubbing varnish surfaced and cleaned, the next cleaning will have to do with the preparation for the finishing coat.

At least two washings of the surface should take place, and for each of these a separate kit of tools, such as sponges, pails, wash leathers, wash brush, etc., will need to be provided. The first washing should have practically everything in common with the final washing, but yet it will differ materially in some respects. It will need to be quite as complete in most things, although it will not suffice. Some particles will escape notice somehow, and these must be caught through the second washing.

After the second washing will come the cleaning and dusting, none of which can well be too thorough. It is just as well to remember that the work thoroughly washed is a little more than two-thirds finished in the estimation of not a few very noted finishers. At any rate, it is great gain to get the surface as clean as a whistle; and to keep it clean there must of necessity be clean surroundings; also a temperature held at a uniform degree, with plenty of light to work by, and, last of all, a good set of nerves to work with and to supplement a high-grade of skill.

With this combination the mere process of finishing ought not to be so difficult as to scare the good finisher out of his wits or his ability to make a success of the work. For the average truck and van work the hard-drying finishing varnish will fill the bill better, as a rule, than the highly elastic and slower drying varnish, and many of these varnishes are exceedingly durable and able to stand all sorts of abuse. The essential thing is to use the best of whatever grade is selected.

Concerning Surfacing Coats

A large percentage of the quality which we try to get into our work as vehicle painters must come, necessarily, through the refinement and application and smoothing up, or down, of the primary surfacing coats—the primers, second coat material, and the roughstuff, etc. The smoother and cleaner and finer we are able to make these various materials the closer they will lay in the matter of their particles, the less work it will need to fetch them down to a smooth and level condition, and the more goodness and real quality the finish will show.

The primer, for example, will need to be enriched and worked to a smooth and fine condition during the course of preparing it for application, and just in proportion as it is made to conform to a standard quality and prove capable of doing the master work for the finish, in precisely this proportion will it render the service best suited to round out a finish to make the painter a proud and happy workman.

Quite the same may be said of the other coats belonging to the primary surfacing series of materials. Take the second coat pigments; whatever these may be the first consideration should be to process them down to a very fine and pliable shape. That is, they should be ground fine—the finer the better. They should likewise have a good balance of materials; just enough raw linseed oil to give them suppleness and binding power, and enough thinner—pure turpentine, only—to bring them to a condition to enable th ebrush hand to work them out minus a brushy appearance or any semblance of roughness.

In handling the roughstuff coats it will be required, first of all, to get the filler ground fine—impalpably fine. It used to be the prevailing notion that roughstuff should be a little coarse in order to measure up to its name and to rub down more quickly, etc., but all this moonshine, to put it no stronger, has been proven of no account whatever, and has been discarded by experienced painters.

You cannot well get roughstuff ground too fine; it is the nature of filler to possess no small amount of grittiness or surfacing coarseness, and no one has ever been able to grind this quality out of the pigment, although by grinding it has been possible to make the material so much smoother that the work of rubbing out has been decreased very largely without any detriment to the quality of the surface; as a matter of fact, it has resulted in an improvement of the surface and in all the results which grow out of surfacing processes.

Labor-Saving Devices

Among these may be mentioned the paint grinding mill; one of these should be in the equipment of every shop, big or little. The writer confesses to being old-fashioned enough to just think that one of the prime necessities of the shop had best be a good, efficient paint mill. It will serve a most useful purpose almost daily, or at least often enough to make itself indispensable.

In the preparation of many coarse materials—and despite the modern refinement of materials we still have much handling and use for the coarser ones—the mill offers the means of making them finer and smoother working and better looking when on the surface; it often lightens the work of mixing supplies, because running them through the mill shapes the material up, refines it, smooths it out and gives it a plastic state it could not otherwise possess.

It is insisted that pigments and colors and varnishes are now furnished the painter in such a state of excellence and refinement that they are practically perfect for application, and, while paint and varnish supplies are being marketed in a condition more suitable and adaptable to actual needs than ever before, as we here gladly and proudly agree, the man in the shop who is charged with the responsibility of doing work of a high class in every particular knows better than anyone

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else what the one hundred and one daily requirements are, and how difficult it is sometimes, with all these splendidly prepared materials, to make ends meet and satisfy a most exacting clientage.

Hence the shop paint grinding mill, along with any and all other devices for helping to make results more consistently uniform and of a high order, may properly be termed essential helps.

The mixing bench is another device without which it is hard to get along, but the gentlemen who sell goods and radiate sunshine, can almost tell you that the mixing bench is a superfluity. But, alas! it isn't, and so we must be borne with a little longer in our determination to have a paint mixing bench right handy to a window affording plenty of light.

Then directly over this bench we would have some shelving space to take care of the containers in which the pigments oftenest in use are available. Over this space provide sliding doors to shut out the dust and dirt. At the right hand of this shell room provide a brush wiping board with a hinged cover to hide the smeary effects. Keep the brush supply in well protected containers adjacent and within reach. In fact, aim to make things handy and helpful; save labor and time and thereby increase your net income.

The "House Paint" Finish

The egg shell gloss or satin finish, so-called in some quarters, more generally known as the "house paint" finish, is produced by some firms by a secret formula—or perhaps we should remark it was formerly so produced, for it is very largely an obsolete practice today—but the main ingredient is raw linseed oil.

A chemically pure oil should be procured for the purpose. This oil used in connection with a japan ground color and the mixture let down with pure spirits of turpentine—one that under the hydrometer test will not register above 31½ degrees nor below 30½ degrees—until in drying out it will not fade past a satin or egg shell gloss, will produce the house paint finish without brush marks when applied by an expert brush hand.

It would be a difficult matter to recommend a cut-and-dried quantity of oil for the mixture owing to the fact that there is great variableness in colors as to the amount of oil and thinning mediums which they will take up and hold in suspension and smoothly incorporate.

It is a mistake to suppose that the color should be used so heavy in consistency that it cannot be worked with a velvet smoothness and entirely free from brush marks. If the preparatory coats have been brought up clean and smooth and dense in their covering capacity, with an oil binder in the color, it will not be necessary to use the finishing coat of color in a consistency much heavier than the regulation color coat.

Personally, we have a preference in this matter of developing a satin effect for the finish for using a "fat" or long oil varnish in the color. This sort of varnish is made so that the weight of the oil is equal to or greater that of the melted resin. Zanzibar copal made into a vehicle varnish on this basis would make a reasonably hard, yet elastic, material, and, while not strictly a "fat" or long oil varnish, will serve the purpose very well.

By fetching up a fine, clean-cut color base for the final coat, we have then only practically to thin the pigment to a working consistency with turpentine, and then carefully add the varnish until under test on a piece of glass it flats to the desired satin luster.

Such a coat would furnish an elastic and very durable dull finish, and stand the heat of the sun and the gas and corrosive touch of the elements quite as durably as anything coming under the title of a flat or house paint finish is able to do. If this material is beaten out smoothly and the varnish added gradually as the mixing goes on it will be no trouble to avoid brush marks in applying it.

The full varnish gloss finish applied and then in due time rubbed and polished not only produces a satin effect that will wear and prove its worth, but it is moreover cleanable, which the "house paint" finish, produced through the use of raw linseed oil or varnish, as one may elect, is not. This, in fact, is the insurmountable disadvantage of the satin luster finish as developed through the use of these ingredients.

A finish on the automobile today for the average car owner, which cannot be cleaned without securing the color effect and otherwise disfiguring the finish, is an intolerable investment. The millionaire not infrequently exploits the finish for the chief purpose, we presume, of having something different from that possessed by his financially weaker neighbor. It represents a freak finish barren of any manifest advantages for which reason it has virtually among the great class of average car owners and users become an outcast.

At the Grand Central Palace and Hotel Astor automobile exhibitions of 1918 a number of cars displayed the "house paint" or satin finish, and the writer interviewed, among others, the representative of one of the great car building concerns of the country in whose exhibit there were one or two of the dull finished cars. His explanation was, in effect, that his firm had only recently refinished most of the cars which it had sent out carrying the satin finish, the work, however well done, having proved unsatisfactory from the standpoint of appearance and uncleanliness and the impossibility of maintaining an attractive color display.

We have taken occasion to criticise the finish in question for the reason that we do not consider such a finish, except in emergency cases or to meet the special requirements of the individual customer, to be an advertising asset nor in any sense ultimately profitable.

Color Mixing for Automobile and Truck Painters

A Table of Hues, Tints and Shades of Colors

Acorn Yellow—White lead, 1 part; raw sienna, 1 part.

Amber—Tinge yellow lake with white, or tinge carmine with yellow.

Amber Yellow—Medium chrome yellow, 8 parts; burnt umber, 5 parts, and burnt sienna, 3 parts.

Antique Brass—White lead, 4 parts; medium chrome yellow, 3 parts, and Vandyke brown, 1 part.

Armenian Red—Venetian red, 2 parts; yellow ochre, 1 part.

Ashes of Roses—Tinge pink slightly with drop black.

Aurora—Medium chrome yellow, 1 part; English vermilion, 1/10 part.

Azure—White lead or zinc, 1 part; ultramarine blue, 1/140 part.

Brass—(See Antique Brass and Yellow Brass).

Brass Shade—Yellow ochre, 4 parts; Vandyke brown, 1 part.

Brown—Red and black.

Brown Pink—White lead, 16 parts; Chatemuc lake, 14 parts; Vandyke brown, 1 part.

Brick—(See Cream Brick).

Brick, Pressed—White lead, 4 parts; Venetian red, 2 parts; Indian red, 1 part.

Brick Red—White lead, 4 parts; Venetian red, 2 parts; Indian red, 1 part.

Bronze Yellow—White lead, 3 parts; medium chrome yellow, 3 parts; raw umber, 1 part.

Buff—White lead, 2 parts; yellow ochre, 1 part.

Buff, Brilliant—Use golden ochre.

Buff, Deep—Tinge ochre with Venetian red.

Buff, Dull—Add burnt umber to buff.

Buff, Light—Reduce ochre with white lead.

Buff, Medium—Add white to ochre, and tinge with a little burnt sienna.

Buff, Rich—Two parts white to one of golden ochre; or, tinge orange yellow with raw sienna.

Buff, Stone—Equal parts of white lead and French ochre.

Buff, Transparent—Zinc white, 3 parts; golden ochre, 1 part.

Buff—Tinge ochre with Indian red.

Carnation—White lead, 12 parts; scarlet lake, 1 part. Or 16 parts inc white and 1 part scarlet lake.

Canary—White lead, 80 parts; lemon chrome yellow, 1 part.

Canary Yellow—White lead, 6 parts; lemon chrome, 1 part.

Cane—Tinge white lead with yellow ochre, and shade it a little with burnt umber or black.

Car Body Yellow—Medium chrome yellow, 1 part; French ochre, 1 part.

Cherry Red—English vermilion, 2 parts; carmine No. 40, 1 part.

Chestnut—Take medium chrome yellow and tone it with red and black.

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Chinese White—Zinc white, 3 parts; whiting, 1 part; white lead, 1 part.

Chocolate—Take yellow chrome and color with red and black.

Citrine—White lead, 75 parts; French ochre, 15 parts; burnt sienna, 4 parts; drop black, 6 parts.

Citron—Tinge orange chrome yellow with chrome green.

Citron Yellow—White lead, 16 parts; lemon chrome, 12 parts; emerald green, 1 part.

Claret—Tinge English purple lake with carmine.

Clay Drab—Tinge white lead with raw umber and raw sienna, and slightly with blue or green.

Clay White—Kaolin, 1 part; zinc white, 1 part.

Colonial Yellow—White lead, 95 parts; French ochre, 3 parts; lemon chrome yellow, 2 parts.

Copper Color—White lead, 20 parts; medium chrome yellow, 4 parts; Venetian red, 3 parts; raw umber, 1 part.

Coral Pink—White lead, 10 parts; vermilion, 3 parts; orange chrome yellow, 2 parts.

Cream—White lead, 98 parts; French ochre, 1½ parts; lemon chrome yellow, ½ part.

Cream Brick—White lead, 400 parts; French ochre, 32 parts; raw umber, 1 part.

Dove—White, tinted with vermilion, Prussian blue and yellow chrome medium.

Drab—White lead, 88 parts; French ochre, 10 parts; lampblack, 2 parts.

Drab, Reddish—White, 90 parts; ochre, 8 parts; burnt umber, 2 parts.

Fawn—White lead, 94 parts; French ochre, 5 parts; burnt umber, 1 part.

Fawn Pink—White, 25 parts; burnt sienna, 3 parts.

Flax Tint—White lead, 100 parts; yellow ochre, 60 parts; lampblack, 1 part.

Flesh Color—White, 95 parts; English vermilion, 3 parts; lemon chrome yellow, 2 parts.

Flesh Ochre—Ochre, 31 parts; red lead, 1 part.

Flesh Tint—White, 120 parts; French ochre, 2 parts; Venetian red, 1 part.

Pink, Opera—White, 50 parts; vermilion, 5 parts; medium chrome green, 1 part.

Pink, Orange—Equal parts white lead and orange mineral.

Pink, Royal—Zinc white, 2 parts; carmine lake, 1 part.

Pink, Shell—White, 50 parts; English vermilion, 2 parts; orange chrome, 1 part; burnt sienna, 1 part.

Portland Stone—Raw umber, French ochre and white lead.

Plum—White, Prussian blue and Venetian red.

Purple—Zinc white, 4 parts; ultramarine blue, 2 parts; carmine, 1 part; or, white, blue and lake.

Purple, Deep Tint—White, 3 parts; ultramarine blue, 1 part; rose pink, 1 part.

Purple, Regal—White, 4 parts; cobalt blue, 2 parts; carmine, 1 part.

Purple, Slate—White, 60 parts; ultramarine blue, 3 parts; Indian red, 1 part.

Purple, Transparent—Cobalt ultramarine, 1 part; carmine No. 40, 1 part.

Red—(See Brick, Cherry, Terra Cotta, Turkish Crescent, Tuscan and Venetian red).

Rose—Tint white zinc with carmine.

Rose Carnation—Zinc white, 8 parts; rose madder, 1 part.

Rose Tint—White lead, 16 parts; English rose pink, 1 part; or zinc white, 16 parts; Munich lake, 1 part.

Rose Tint, Deep—Zinc white, 8 parts; Victoria lake, 1 part.

Rose Tint, Pale—Zinc white, 32 parts; Florentine lake, 1 part.

Rose Tint, Royal—White, 16 parts; English rose lake, 1 part.

Russet—Orange and purple, or red, blue and yellow.

Russet, Pure—Orange chrome, 10 parts; medium chrome green, 1 part.

Salmon—White, 36 parts; golden ochre, 4 parts; English vermilion, 1 part; or white, 88 parts; ochre, 8 parts; medium chrome yellow, 2 parts; Venetian red, 2 parts.

Salmon Tint—White, 60 parts; vermilion, 4 parts; lemon chrome yellow, 1 part.

Sandstone—White, yellow chrome, lampblack and Indian red.

Scarlet Tint, Deep—Vermilion, 8 parts; carmine, 1 part; white, 1 part.

Silver—White, indigo and drop black

Silver Gray—White, 97 parts; ochre, 2 parts; lampblack, 1 part.

Sky Blue—White, 99 parts; Prussian blue, 1 part.

Slate—Tone white with red and darken with drop black and blue.

Spruce—White, 80 parts; French ochre, 10 parts; medium chrome yellow, 6 parts; bright Venetian red, 4 parts.

Stone—White, yellow ochre and burnt umber; or, raw sienna, burnt umber and white.

Stone—(See also Greenstone, Limestone, Portland Stone, Sandstone).

Straw—White, 90 parts; ochre, 7 parts; medium yellow chrome, 3 parts; or white, 8 parts; medium chrome yellow, 1 part.

Sulphur Yellow—Equal parts white lead and lemon chrome yellow.

Tan—White, 90 parts; bright Venetian red, 7 parts; medium chrome yellow, 2 parts; lampblack, 1 part.

Terra Cotta—White, 2 parts; golden ochre, 1 part; burnt sienna, 2 parts; or, white, 85 parts; burnt sienna, 15 parts.

Terra Cotta, Light—White, 3 parts; raw sienna, 1 part.

Terra Cotta Red—Equal parts white lead and burnt sienna.

Terra Cotta Tint—Burnt sienna, 1 part; white, 20 parts.

Turkish Crescent Red—Indian red, 1 part; aniline vermilion, 1 part; rose pink, 1 part.

Tuscan Red—Indian red, 8 parts; rose pink, 1 part.

Vermilion, Rich—English vermilion, 3 parts; orange mineral, 1 part.

Violet Tint—White, 6 parts; ultramarine blue, 3 parts; English rose lake, 3 parts; ivory drop black, 1 part.

Violet, Transparent—Ultramarine blue, 4 parts; orange mineral, 1 part.

White—(See Chinese White, Clay White).

Wine—Tinge purple lake with blue.

Yellow—(See also Acorn Yellow, Bronze Yellow, Canary, Citron Yellow, Car Body Yellow, Golden Yellow, Sulphur Yellow).

Yellow, Brass—White, 40 parts; light chrome yellow, 12 parts; burnt umber, 1 part.

Yellow Flesh Tint—White, 80 parts; light cadmium yellow, 1 part.

Yellow, Rich—White, 6 parts; medium chrome yellow, 1 part.

Yellow Tint, Transparent—Zinc white, 8 parts; yellow lake, 1 part.

Yellow, Topaz—White, 4 parts; yellow lake, 1 part.

Yellow, Transparent—Yellow lake makes the finest. Dutch pink for cheap color. Gamboge makes a very bright color.

Geranium Pink—Zinc white, 60 parts; geranium lake, 1 part.

Gold—White, yellow, red and raw umber; or white, lemon yellow and burnt sienna; or tinge ochre with red and blue.

Golden Orange—Orange mineral, 2 parts; golden ochre, 1 part.

Golden Russet—Lemon chrome, 3 parts; Venetian red, 1 part.

Golden Tint—White, 30 parts; ochre, 5 parts; vermilion, 1 part.

Golden Yellow—Lemon chrome, 10 parts; orange chrome, 2 parts; white, 5 parts.

Gray—White tinted with ultramarine blue, or lake, or burnt sienna and indigo, or with vegetable black or lake, or with Prussian blue and Indian red.

Green—(See Olive).

Green, Brilliant—White and emerald green.

Green Stone—White, 90 parts; medium chrome green, 3 parts; raw umber, 3 parts.

Hay Tint—White, 45 parts; golden ochre, 15 parts; medium chrome green, 2 parts.

Imperial Orange Red—Solferino lake, 4 parts; yellow lake, 1 part.

Ivory—White, 98 parts; raw sienna, 1 part; lemon chrome, 1 part.

Jonquil—Tinge white with medium chrome yellow.

Lavender—Zinc white, 16 parts; mauve lake, 1 part; rose madder, 2 parts.

Lavender Tint—Zinc white, 80 parts; ultramarine blue, 3 parts; carmine, 1 part; or, white lead, 48 parts; ultramarine blue, 1 part, and rose pink, 1 part.

Lead Color—White, 98 parts; lampblack, 2 parts.

Leather—Tone burnt umber and burnt sienna with white lead.

Leather, Yellow—White, 20 parts; golden ochre, 2 parts; burnt sienna, 1 part.

Lemon—Lemon chrome yellow.

Lilac—White, 96 parts; Tuscan red, 3 parts; ultramarine blue, 1 part; or, use vermilion instead of Tuscan red.

Lilac, American—White, red madder lake and ultramarine blue.

Lilac, English—White, lake and Bremen blue.

Lilac, French—White, carmine and Prussian blue.

Lilac, Purple Tint—White, 16 parts; cobalt blue, 1 part; carmine lake, 1 part.

Lilac, Rich—Zinc white, 64 parts; mauve lake, 1 part; madder lake, 1 part.

(Continued on page 54)

Upholstery, Toppings and Mountings

The Art of Motor Car Trimming

It has been truly said that the automobile or carriage trimmer must "quilt like an upholsterer, stitch like a harness maker, and sew like a tailor." It is just as necessary that he should have good taste and a knowledge of design, proportion and color. The materials he uses are among the most costly of those employed in the factory and require great care in storage and in working, to avoid waste. So there is a great deal for the young automobile trimmer to learn before he can consider himself an expert.

Mr. Newcomb's series of articles, now running in "The Vehicle Monthly," are intended to cover the whole subject of automobile upholstering. He has taken up the art at the beginning, and as the series proceeds will impart to his readers many useful hints and helps, as valuable to most journeymen as to the average apprentice. The series will conclude with the selection of several typical cars, for which Mr. Newcomb will furnish complete trim instruction from the start to finish.

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Upholstery, Toppings, Mountings

A Five-Passenger Touring Car in Leather Substitute

By JOSEPH A. NEWCOMB

In this article it is my purpose to treat specifically of the upholstering of a five-passenger touring car body, making a comparison between the costs of using a high-grade, hand-buffed leather and a good quality leather substitute. For the upholstering materials the comparison will be made between a black hand-buff leather, pebble grain, semi-bright finish, costing 45 cents per foot, and a leather substitute of the same color, grain and finish, costing $2.35 per yard, fifty inches wide.

This means, of course, that a yard of leather substitute represents 12½ square feet. On this basis a yard of leather would cost, fifty inches wide, $5.62½, or approximately two and one-half times as much as the leather substitute. So it can readily be seen that the leather substitute has a big handicap in first cost. This is not all. A hide of leather really represents to an automobile trimmer 66⅔ per cent. actual cutting surface on long-grain leather and possibly 75 per cent. to 80 per cent. on pebble grain leather. In other words, due to the irregularity in shapes and sizes of hides, the waste and offal in leather increases the cost fully 33⅓ per cent. for the net footage obtained.

Thus a square foot of leather represents 60 cents per foot, and on this basis compared with its substitute a yard of leather 50 inches wide would cost $7.50, or over three times the cost of the substitute.

In addition to the purchase price there is a big margin in the difference in time required for cutting leather and leather substitutes. Leather hides vary in shapes and sizes; therefore, to cut economically, but one hide can be cut at a time, and to get the most out of it the patterns must be laid out on it, shifted and exchanged, requiring patience and time. Leather substitutes are furnished 50 inches wide, in rolls of from 50 to 60 yards, and the patterns can be laid out to utilize virtually all of it. A piece, say, two, three or four yards, can be laid out, depending altogether on what lengths cut to advantage, and the size of the cutting table. This needs to be done but once for any particular style, and then a stack of, say, twenty to twenty-five such pieces, can be cut at one and the same time with an elastic cutting knife, such as the "Universal." It is evident, I am sure, that this represents a considerable saving.

All these advantages, of course, have been noted by the manufacturers of large numbers of bodies and they have been very quick to adopt leather substitutes as a standard material for upholstering. There are, of course, many grades of leather substitutes and imitations, and as many different prices. The grade to which I refer, however, is the best.

Many body manufacturers of the higher grades of bodies have been loth to use a leather substitute, merely because of its name, and not because of the quality or service which it renders. They have used machine buffs, splits and hoopers because they could call it leather, but a good leather substitute is better than such grades of leather.

This article tells how to upholster a Five-Passenger Automobile Body in substitute leather, and furnishes some idea of the relative savings in money costs through the use of the lower-priced upholstering material. - - - -

The results obtained in the use of leather substitutes, so far as appearance and service are concerned, depend entirely on the effort expended and the skill and efficiency of the mechanic. This applies likewise to hand-buffed leather or any other material which may be used. A beautiful, costly piece of material easily looses its value in the hands of careless, inefficient mechanics.

No fault can be found with the working qualities of a good leather substitute. It can be adopted and used for any style of trimming where leather could be used. And a good leather substitute will not fade nor discolor. It is not affected by the weather or water, so I have no hesitancy in suggesting its use in a high-grade body.

In the upholstering of the body which I shall describe I propose to use the French plait style, and I would like to call your attention to the fact that the style I describe is the *genuine* French plait. It is sewed up on a foundation and filled with cotton wadding. In the sewing of a good leather substitute no trouble with the tearing of the material where sewed will be encountered if the proper needle, proper number of stitches to the inch and the right thread are used. There is in fact less danger of this trouble with a good substitute than with splits and other so-called leathers.

The Making of Master Patterns

In the cutting of the upholstering material proper, for production work, the following method is used to good advantage, since it minimizes waste.

After the first body is ready to trim, and the springs and foundations have been built in, patterns are taken for the upholstering material proper. This material is then made up and tested. Every fraction of an inch that the pattern can be reduced without bad effects or harder working is deducted from the patterns. After this is done the patterns are assembled for cutting, so arranged as to cut from the least amount of material.

When the proper arrangement of the patterns to do this has been decided, a draft of the positions of the various patterns is made, showing the cutting arrangement, so that no matter how often the cutting operation must be repeated, the patterns will be placed in the same manner and a specific amount of material will be cut, preventing the fluctuation of coats.

For custom work, where only a single job or just a few are required to be cut, the same method should be pursued so far as possible. At least, no material should be cut until a pattern has been made for each section, and a rough draft made of the pattern layout so as to cut from the least amount of material.

The Style of Upholstering Determines the Character of the Springs

In the upholstering of any body the springs are the first items to receive consideration. Patterns for them should be made just as early in the stage of production as is possible, so that they may be ordered and be in stock when the body is ready to upholster. The style and method of upholstering determines the character of springs to be used. When the method used endeavors to minimize the use of hair a different type and shape of spring must be used. It must be formed to the desired shape of the upholstering. In a method where a hair foundation pad is made over the spring, the spring may be made flat, but there is a big difference in the gauge of wire, number of coils, etc., in these two types of springs.

In making the back spring, allowance should be made at the bottom for the space that the cushion will occupy, and on the sides a sufficient amount must be allowed for the quarter pads and for the turning in of the material for the back trimming. The

back spring must be allowed to work free of the quarters. If the spring is made too wide it buckles, thus making an uneven shape and tending to destroy its resiliency.

The Cushion Springs

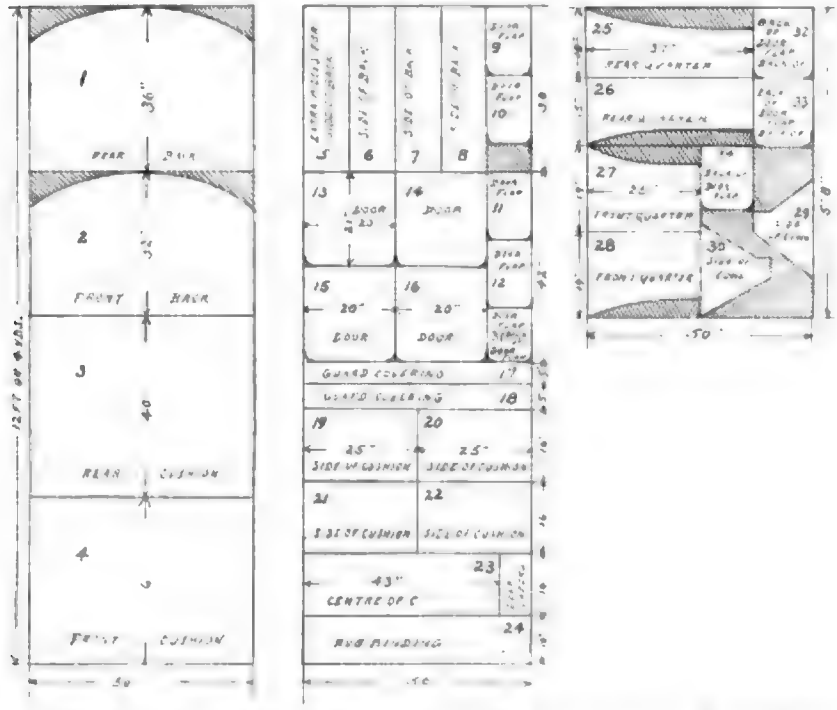
Cushion springs, for both the front and rear seats, should have the proper amount of pitch, in any case not less than two inches. The pitch is regulated according to the construction of the car, as well as to the height of the springs. Seat framing very often regulates the height of the springs. In no case should it be that the height of the cushion is over fifteen inches.

When a cushion sets close to the floor and is, so to speak, low, considerable pitch must be given to it. This is particularly true in the driving seats. By giving the cushion a deep pitch, comfort is afforded the driver because of the support which is given his legs just above and in back of the knees, since in driving a car built low, the knees are somewhat elevated when the feet of the driver are on the pedals.

Since the springs are the main factors in the proper riding quality and comfort of an automobile they must have serious consideration regardless of the material used to cover them, and as deep a spring as is possible should be used both in the backs and cushions.

An automobile may be beautifully designed, displaying wonderful mechanical skill, yet the comfort thereof may be lost due to the inefficiency of the springs, which are really half the secret of comfortable upholstering. Where the method of upholstering is such that the cushion fits under the back and not merely up against it, five-eighth inch clearance only is allowed at the rear of the cushion and on each side for the quarters. The average height of a cushion spring is eight inches at the front and five inches at the back, allowing a pitch of three inches.

A popular method of using the spring is to attach it to a wood frame. The width of the sides and ends of this frame varying according to the thickness and kind of lumber used, the average being seven-eighth-inch poplar three inches wide, and the springs attached thereto by means of galvanized wire staples. While the cushion springs are attached to a wood frame, the back springs are attached to the body by means of iron straps.



Layout of patterns for touring car upholstery on a strip of leather substitute 50 inches wide and ten yards long. The shaded portions represent the waste material.

Making and Hanging Backs and Quarters

The spring being placed in position, it is covered with a piece of ten-ounce duck or burlap and nailed to the blocking at the bottom, and the duck then stretched tightly over the spring and nailed to the blocking at the top of the spring. A woven hair pad can be laid over this, which should be covered with muslin, and the back is ready for the outer covering of leather substitute.

To get the pattern for this, a piece of goods is stretched over the back as made, marked around the top where finish is intended, at the bottom at the seat board and at the sides where it meets the quarters. The pattern is taken off and the foundation marked out.

The plaits should be about four inches in width. The outside block should be the wider by about one inch at the bottom, which tapers out wider at the top, making in all about ten blocks across the back. The bottom line at the seat board is the "objective line" for laying out. The plaits should be spaced from the center. Thus the foundation is laid out.

The fullness pattern is arrived at by adding three-quarters inch for each plait and allowing on the outer plaits a sufficient amount of material to turn under when finished, which figures about ten inches from the outer lines or last line for plaiting. From this pattern (the fullness pattern) the material is marked out and cut.

The operating should be done so that the plaits throw to the left. The leather substitute is stitched to the foundation as previously mentioned. The plaits are filled with cotton bats of the required thickness and width. These are placed by means of a pusher or paddle, and the back is ready to be tacked in position, tacking the bottom first and stretching to the top, turning the surplus goods in at the ends, closing in the back. In hanging the back we should work from the center at the top and bottom, using the measurement of the foundation pattern to get the correct space in the width.

For the quarters the pattern are made following the same method used for the back. The quarters, of course, are hung in before the back is placed in position. The front and rear backs and quarters are worked with the same method. The finish for the backs and quarters, where the backs and quarters are tacked to the seat frame, is made with the manufactured gimp, which is also used around the tops of the backs and quarters. Care should be taken that the leather substitute is drawn tight and the plait lines perfectly straight.

Making Up the Cushions

After the spring is attached to a wood frame, as mentioned, it should be covered with a piece of burlap on which is placed a sheet of interwoven laced hair, cut the exact size of the top of the spring. This is then covered with muslin, covering the entire spring and tacking to the wood frame, the surplus material being plaited in at the corners. In making the patterns for the outer covering, a piece of goods is drawn over the springs as now made up, representing the cushion covering.

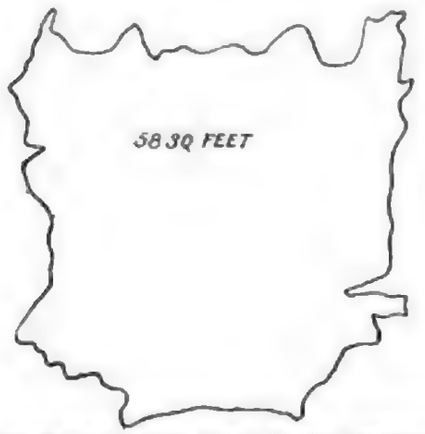
Before proceeding further, in order to get correct lines to match the lines of the back, the cushion should be placed in the job and the plaits marked off to match the back. I am mentioning this only as a pointer to the beginner, to call attention to the fact that the lines of back and cushion should match. But it is not necessary to do this if the measurements of your foundation patterns or drafts are followed.

The correct method is to work from the center of the back and the cushion. As an illustration, if the last lines on the back measure 38 inches in width, so should the same measurement be held in laying out the cushion pattern, and when the cushion covering is being placed in position and worked from the center and causing the outer lines to come to the measurement of 38 inches, the lines must match.

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The outer covering is made up the same as the back, stretched over the spring and foundation and tacked to the bottom of the wood frame. This cushion should be made in one section, covering the entire spring front, back and sides, not using a cord and facing. This saves operating and permits of more rapid assembly. The surplus goods at the corners is turned in as a plait for finish. The finish at the bottom of the cushion is made with a gimp to cover the raw edges and tacks. This style of back and cushion can be made either with hair or with cotton batts.

After the backs are hung, the cushion keepers or seat guards are covered, tacking the goods on the edge of the seat first, screwing seat guard in position and covering it with a layer of cotton. Turn the goods in at the end, stretch the leather substitute over the top of the guard and tack to the seat frame. We use the cotton covering to ease the wear of the outer covering, whether the material be cloth, leather or a leather substitute. The cowl trimming is fitted in three sections, the center and the two sides. The three sections are sewed together by a seam as near the center of the radius as possible, to get a smooth finish. Tack around the outer edges, and where finish is required, finish with a manufactured gimp.



This diagram represents a hide of leather containing 58 square feet.

There is only one carpet used, that of the rear floor, which is finished by binding with the same material in which the body is trimmed. A heel carpet under the rear seat and a toe carpet under the bottom of the rear of the front back are bound in the same way as the floor carpet. The width of the carpet on a small job is usually sufficient for these three sections.

The Door Trimming

The trimming of the doors on this grade of work is very plain. The doors should be lined with goods provided for this purpose, say a light-weight drill. It is paster in position. The foundation should be of duck or canvas fitted with an opening for a pocket. The leather substitute is placed over this and hemmed around the opening for the pocket and tacked around the door where the finish is to come. The flap is made with a foundation of duck or canvas, padded with a layer of cotton, and the leather substitute is hemmed to the foundation and tacked in position, fasteners being provided to hold the flap to the door covering and finished off around the edges with a gimp. All gimp finishes are tacked in position with small-headed 10-ounce lining nails.

The writer is preparing for an early issue an article describing the upholstery of a classy runabout in genuine brown Spanish leather. This will appear in July or August. A draft of this car is shown on page 27 of this number.

The Old Truck Foundation

In the repainting of the truck or van it is very necessary to get the bare spots patched up with some good strong primary pigment capable of holding up the after coatings. When the old finish is chipped off examination will disclose, as a rule, a rusty and corroded surface, and this condition should be cleared up before proceeding to apply any sort of coating over the patch. And it does not pay to take any chances with the finish immediately around the bad place on the surface, for not infrequently the old paint and varnish will be found at the edge of the patch shelly and crisp and breaking off in fragments.

All this lifeless material will need to come off as far as it shows a condition not entirely strong and supple. The steel scraper will be required to effect this removal, and it should be applied along with plenty of elbow grease. Then the entire patch had best be sandpapered well to make the surface clean and in suitable shape to hold the paint. Then apply a good oxide primer that carries enough elasticity to fasten the pigment securely to the surface.

In this manner you will be able to make the finish over these broken places hold most securely. In stopping this cavity it will be required that a hard-drying putty be used; regular hard-drying carriage putty. This may be applied one day and in good drying quarters sandpapered the next. The old truck surfaces will need hard and thorough sandpapering when they are found at all stricken with the blight of long wear, or, at all events, wear of a particularly hard sort.



JITNEY BUS USED BY U. S. NAVY AT NEWPORT, R. I.
Body built by the Sawyer Carriage Co., Lowell, Mass. An interior view of this body is shown on page 42.

Top and Body Fabrics and Fittings

The H. D. Taylor Co., Buffalo, N. Y., report that business, particularly in their automobile trimming division, far exceeds expectations.

During the period of the war H. D. Taylor Co. was one of the larger Government contractors engaged in the manufacture of textile equipment. A large force was employed producing helmet linings, rook bags, artillery covers, towels, tool bags, etc.

The H. D. Taylor Co. has been identified for years as one of the foremost supply houses in America. Established in 1833, the policy of the house has always favored the expansion of its business necessary to give customers the best possible service.

Automobile body builders and trimmers will find in their warehouses practically everything required in their business.

The following will give an idea of the items carried in stock: Body cloths, top and slip cover materials, celluloid, imitation leathers, bindings, tacks, wadding, webbings, oilcloth, enameled goods, ducks, drills, sheetings, felts, tools of all kinds, etc.

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JITNEY BUS, USED BY THE U. S. NAVAL TRAINING STATION AT NEWPORT, R. I.
A view of the exterior of this car will be found on page 41. Body built and upholstery work done by The Sawyer Carriage Co., Lowell, Mass.



INTERIOR OF AMBULANCE BODY ON PACKARD CHASSIS.
Body and upholstery work by A. J. Monday Co., Milwaukee, Wis.

TWO INTERIORS OF COMMERCIAL CARS THAT WILL BE SUGGESTIVE TO TRIMMERS

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O'BANNON COATED FABRICS



Ideal for Upholstery

While possessing the proper texture, weight and color varieties for finest closed car work, it also has the durability that recommends it for use on motor trucks and delivery cars.



O'BANNON CORPORATION

200 Fifth Avenue

NEW YORK

O'BANNON FABRICS

O'BANNON COATED FABRICS

ARTFUL APPLICATIONS

The wearing quality of O'Bannon Moleskin has been proven to be the best of all leather substitutes. The backing or foundation for this grade is carefully selected, both for weight and strength, and the coating is of such a character and applied in such a manner that it adheres thoroughly. Extremely long service is assured.

The coating is of such a nature that it will not crack, and it is so applied that it will not peel.

O'Bannon Moleskin, when used by a capable automobile upholsterer in an automobile body, will outlive the car.

More than that could not be expected from genuine hand-buffed leather, and much less would be expected from split leather.

The results produced by the use of O'Bannon Coated Fabrics are limited only by the skill of the mechanic handling them. Many times some of the virtue of a material is lost by inefficiency in its application. The Moleskin quality referred to above, when used with proper workmanlike upholstery methods, will give better results and present a finer appearance than any other substitute manufactured.

In the stitching of leather substitutes, a diamond point needle will be found quite satisfactory—and remember that there is less danger of stitches tearing out in a leather substitute like O'Bannon's than in many so-called leathers, or splits.

A substitute, to have real value, must be of such a character that it can be used wherever the genuine could be used. This applies to a leather substitute, of course.

It must first of all have the appearance of leather.

In finish and grain it must so closely resemble leather that extremely close examination is required to distinguish it.

To the touch it must feel like leather.

And it must be soft and pliable so as to be easily worked.

It must not be sticky—the color must not rub off—it must not crack nor peel.

It must stand rough usage.

Climatic conditions and water must not affect it.

O'Bannon's leather substitute is such a material.

It is made in various colors, finishes and grains. The three standard finishes are glazed, medium bright and dull. The most popular is the medium bright finish. It comes in all the standard leather colors and grains.

O'BANNON COATED FABRICS

O'BANNON CORPORATION

OF O'BANNON PRODUCTS O'BANNON COATED FABRICS

Don't blame the upholstering material if your car is uncomfortable. First determine whether your car is built so as to make comfort possible. Have you allowed ample seat room? Can the cushion be made high enough to permit the use of the proper spring? Will the size of the body permit of a deep, soft, springy back? If these points are lacking, no material, regardless of its nature or cost, will make the car comfortable.

However, if these points have been rightly attended to and ordinary skill is used, a leather substitute such as O'Bannon supplies will permit the making of wonderfully comfortable and serviceable upholstery.

Spring arrangement and spring construction are big factors in securing maximum results in automobile upholstery. A spring too stiff, even with the best of materials used, tends to create unsatisfactory automobile upholstery. Proper spring arrangement lengthens the life of upholstering material as well as adding to the comfort of the passengers.

The proper amount of fullness applied in the laying out of the patterns for automobile upholstery is a feature that should be carefully watched. For instance, on French plait work, if the proper amount of fullness is used (and ¾ inch is usually sufficient) the stitching at the plaits will be relieved of a great amount of strain. When too little fullness is allowed the stitching is required to stand the strain when subjected to usage, thereby increasing the wear and tear of the material. This applies to all styles of upholstery.

In the French plait style of upholstery, which requires sewing, the covering material should be sewed to a foundation of duck or other suitable goods, the purpose of which is to relieve the strain on the upholstering material proper, no fullness being allowed in this foundation.

For general automobile body upholstery O'Bannon Moleskin Quality, black color, medium bright finish, is the most popular material. It is furnished in rolls 50 inches wide, and is an extremely satisfactory piece of goods. It is being used in very great quantities by some of the largest automobile manufacturers in the country, giving perfect satisfaction.

200 FIFTH AVE. NEW YORK O'BANNON COATED FABRICS

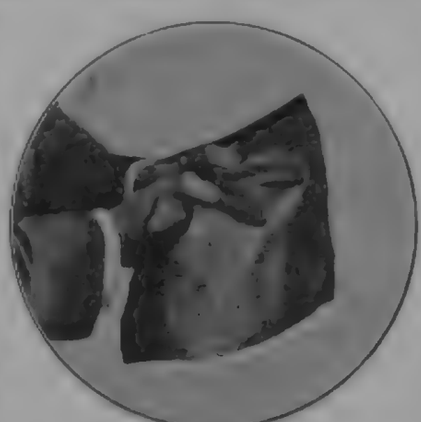
O'BANNON COATED FABRICS

DUXRANE

REG. U.S. PAT. OFF.

SINGLE-TEXTURE TOP-FABRIC

GIVE it the *Scrub Test.* Take a piece of Duxrane in your hand and treat it rough. Scrub it together unmercifully, precisely as a washwoman scrubs clothes. Don't be afraid of injuring the surface, because you can't. Rub it hard, so hard that the surface will become hot, then try to peel off the coating. You will find that it adheres so tenaciously to the fabric that it cannot be peeled. This is the test devised by experts who buy rubberized top fabrics. It is far more severe than any test to which the material could possibly be subjected to in actual use or service. Isn't there a sense of satisfaction to you as a Trimmer to know that the tops you put out will stand up under the most severe use and service and retain a new, snappy appearance? Let us send you a sample of Duxrane to test as we have suggested. Seeing is believing and a test is the final proof of superiority.



O'BANNON CORPORATION

200 FIFTH AVENUE : NEW YORK

O'BANNON COATED FABRICS

News in the Trade

A Beckwith-Chandler Man in South America

SANTIAGO, CHILE, March 23, 1919.

EDITOR THE VEHICLE MONTHLY:

When I got aboard the steamship "Panama" at New York, February 6th, for the voyage to South America, I found there copies of THE VEHICLE MONTHLY and THE VEHICLE YEAR BOOK, which were most welcome, I assure you, and for which I should have thanked you ere this. The delay is not because of lack of appreciation, but because I wanted to be able to tell you something of this country, and am just getting into things far enough to have something to say.

The voyage to this southern continent, especially under present transportation conditions, is a long one, and I did not arrive in Valparaiso, my first real stopping place, until a month after leaving the States. But the very deliberation with which the voyage was made had its advantages in opportunities for observation which I otherwise would not have had.

Panama and the Canal Zone

There were no stops until we reached Colon, where I spent four days with ever increasing wonder at what the U. S. Government has accomplished in the Canal Zone. To describe it would be a long story, but no American to whom such a trip is possible should fail to visit the Panama Canal Zone.

At Colon it was necessary to continue in a Chilean steamer, the "Huasco," and no stop was made until the ship reached Paita, Peru. Three days out of Colon we sighted Cape Blanco, the most westerly point of land on the southern continent, and the same evening reached Paita. This is the oil-producing district of the South Pacific coast and derricks and tanks were pretty thick; there is also some cotton grown a short distance back from the coast and shipped from Paita, and this is where nearly all the so-called Panama hats are made. It is a desert, and no rain ever falls. What water they have is distilled from sea water, but the temperature is not high at any season of the year.

Some Peruvian Ports Visited

After Cape Blanco the ship never gets out of sight of land until Valparaiso is reached, and most of the time the vessel is within from two to five miles from shore.

Stops from a couple of hours to two days, according to the importance of the port, at Pacasmayo and Salaverry, sugar ports (sugar is grown by irrigation and partially refined here); Callao, which is the port for Lima and the most important port in Peru; Mollendo, the terminus of one of the Bolivian Railways which brings down from the mountains considerable quantities of tin, gold and silver ores. This is the last port we visited in Peru.

Progressive Chile

Arica is the next port that I entered, and is the most northerly in Chile. This province and Tacna adjoining it are the territory now in dispute between Chile and Peru. Then come Iquique and Antofagasta. These two ports are good hustling business towns and are the principal shipping points for nitrates and copper, both of which are mined in great quantities not far from this part of the coast. The great mines of The Braden Copper Co. are near here and are reached by rail.

After that, Coquimbo, and then Valparaiso, which is by long odds the most important of the South Pacific ports, and a city of 200,000 inhabitants, so it is claimed.

Not one of these ports has any docking facilities, though Valparaiso now has some docks in course of construction, and every bit of freight is loaded and unloaded by means of lighters.

None of the harbors are protected in any way and some of them are open roadsteads where the water is often rough and loading and unloading very difficult. This, together with the fact that stevedores are none too careful, makes for extremely rough handling and accounts in a large measure for the tremendous amount of goods damaged in transit. If these facts were generally known and duly considered by shippers in the States more substantial packing might result and many thousands of losses avoided.

From Cape Blanco to Valparaiso

Along the entire distance from Cape Blanco to Valparaiso, some three thousand miles, the foothills of the Andes come practically to the waters' edge, and it is all desert country, where rain is almost unknown, and yet the climate is pleasant, never being either extremely hot or cold.

When we crossed the Equator at three o'clock in the afternoon it was cool enough for light overcoats. This sounds unreasonable, but is literally true, and I am told that there is little variation from one year to another. The condition is accounted for by the presence, near the coast, of the Humboldt Current, an Antarctic stream.

But the mountains are devoid of vegetation and nothing grows except in the few places where mountain streams come down from the snow line. This makes possible the raising of cotton, a long staple of fine quality, and sugar cane.

Tractors are just beginning to be introduced, but I have no information as to what success is being met.

Wherever water can be obtained in the northern or desert section of Chile crops, such as corn, grass, alfalfa, nearly all vegetables and fruits, grow wonderfully well and the fruits, especially grapes, are remarkably fine. The southern section of the country (Chile is twenty-six hundred miles long, from north to south) has a four-season climate similar to the United States, and raises grains, fruits and garden truck in great variety and of fine quality.

Motor Cars in Chile and Peru

There are no roads in Chile and Peru except the trails made by ox teams, and the use of wheeled vehicles for pleasure is out of the question. It is true that in the larger towns, where streets are passably good, carriages have been used, and now a great many motor cars are being brought in, and nearly all from the United States. Most of the well-known makes are represented, and I am told that this has been brought about within a very short time.

Carriages, Wagons and Carts

The only carriages I have seen all the way down from Panama to Valparaiso is a type of victoria of sizes varying from the pony size in Panama and Colon, where all the draft animals are small, and these "coches" are drawn by one small pony or mule to a full-sized and very substantial two-horse vehicle in Santiago and Valparaiso.

The horses in Chile are good and about the size common in the States, and in Santiago and Valparaiso there are running races every Sunday during the year by good horses, most of them English thoroughbreds, so I am told. Most of the carriages have been made locally, though some of the finer were imported from Europe. But that industry seems on the verge of being a thing of history, so far as Chile is concerned.

Most of the small deliveries, even in the cities, are made by pack horses and a few mules. Groceries, milk in ordinary cans, lumber, furniture and every conceivable thing are carried on the backs of horses. But the heavy hauling is done by heavy two-wheeled carts drawn by horses, mules or oxen. They have an odd way of hitching, and use breast straps almost entirely. One horse is hitched in the usual way, and, regardless of the size or weight of cart, then a second is hitched, usually by one trace, to the near side, and the driver usually rides this one. Then if the load is too heavy a third is hitched in the same way to the other side.

Altogether, I can see no possibility of

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of horse-drawn vehicle business in western South America.

Just now commercial conditions are not very good, but this seems to be only a temporary condition, due to the sudden ending of the European war. In Chile the "peso" is now worth about 19 cents and fluctuates in value from day to day. In Peru there is a little more stable currency and the "sol," their unit value, is worth 50 cents in United States money. By the time this letter reaches you there may be a considrable change in these conditions.

So far, I have found South America very agreeable. The climate is pleasant, traveling conditions reasonably good and business is coming my way. In the vehicle and railway lines I find them very exacting, but Beckwith-Chandler varnishes are in use to quite an encouraging extent, and arrangements for further extension of our relations are being perfected.

I wish to be remembered to all my friends in the auto and carriage trades in the States.

Yours cordially,

W. J. R. ALEXANDER.

Buying "Bargain" Tires

By RICHARD H. LEE, Special Counsel, Associated Advertising Clubs

I sometimes wonder that people will believe so many things they hear. Some of us seem to be so constituted that we fall easy victims to the schemes of fakirs, however archaic they may be.

Take, for example, the "bargain" automobile tire.

There are many tricks in the business of selling "bargains" in automobile tires and accessories.

Occasionally, such dealers carry a few standard tires and sell them as "loss leaders"—when the customer persists long enough in his determination to buy the real thing and does not allow himself to be "switched." But still oftener, the few standard tires such dealers have are "out sizes," and since 95 per cent of those who call require "popular" sizes, they become "live" prospects for a piece of "rag and rubber."

Tire "Seconds" Not Guaranteed

More frequently, advertisements of cut prices are based on stocks of "seconds." Legitimate tire manufacturers always try to obliterate identification marks from "second" tires, but when the brand has a distinctive tread, this is not possible. In some cases they are plainly branded on the side walls with the word "second." If a casing carries a spot where the name, number or anything else has been removed, it is in all probability a "second."

"Second" tires are those which show a patent defect on inspection at the factory. It may only be a blemish or it may be a defect so serious that the tire will blow out on inflation. "Second" tires are in a sense a gamble; they may give you the mileage of a "first"; they may give you nothing. For that reason, the factory does not stand behind them.

Occasionally, bankrupt stocks of standard tires are offered. In many cases, these have remained in storage while the machinery of the law has been grinding, and when offered to the public are dried out and lack resiliency. In that condition, they would not be offered for sale as "firsts" by a reputable dealer.

Cut-Price Tires Merit Suspicion

A cut-price tire merits suspicion on the single ground that it is a cut-price tire, for no legitimate manufacturer could profitably prefer one customer to another in the same class, in the matter of prices quoted. Such a course would as a natural consequence develop price cutting—price cutting would destroy profits, and the destruction of profits would make the account unprofitable to the agent, thereby destroying the sales organization of the manufacturer.

It would seem easy even for a person with no experience in business to understand and believe that no manufacturer makes a different price to his customers, and it should be apparent, also, that all dealers have fixed operating expenses, so that when prices are cut, something must be the matter.

If you were a manufacturer, would you stock up your regular dealers, upon whom you must depend to get your goods to the motorists, and then turn around and sell tires of the same grade to another man at a lower price so that he could drive your regular dealer out of business? I do not believe you would, and of course the manufacturer knows more than that. His regular dealer's good-will is an asset worth a great deal of money to him. He values it just as he values the good-will of the buying public.

Goodyear Team's Winning Season

The basketball team of the Goodyear Tire and Rubber Company, Akron, Ohio, has just completed the most successful season in its history, although it has been winning championships for the past four years. During the season just finished 23 games were played, of which 21 were victories. This record carries with it the championship of the city industrial league, Goodyear having defeated all other teams in the league twice. In addition to these local honors the team won the first annual industrial basketball championship at Cleveland, Ohio, winning three games in one afternoon.

J. A. Pugsley & Co., 45 Princess Street, St John's, New Brunswick, Canada, have taken over the Maritime Province assembling plant of the Ford Motor Company of Canada, Ltd., in which the first-named company will manufacture standard stake and express bodies to fit the one-ton Ford truck. Later they will build special bodies to order.

The Militor Motors Company

A merger of the interests of the Knox Motors Company, Springfield, Mass., with the Militor Corporation of New York is announced by N. R. Sinclair, president of the amalgamated company. The consolidated corporation will be known as the Militor Motors Company and will have a capital of $2,500,000.

The original Militor Corporation was organized for the production of war vehicles for the United States Government. In its extensive laboratories at Jersey City were developed the Militor motorcycle and the Militor standardized four-wheel-drive truck. The heavy duty Militor truck was designed for and adopted by the General Staff of the United States Army as the standard four-wheel-drive truck for Government use.

With the end of hostilities the Militor Corporation began immediate plans for the production of its machine, and with the consolidation of the Militor and Knox interests the Militor motorcycle will be manufactured in large quantities. To the above lines will also be added the production of a light passenger car. It is also anticipated that the Militor Motors Company will continue the production of the line of Knox motors.

The Knox plant is one of the most modern and completely equipped of its kind in the country. The Springfield establishment has more than 230,000 square feet of floor space and a complete equipment of machinery, particularly suited to the products of the Militor Company, who are now completing plans for immediate production on a large scale.

The officers of the consolidated company are: President, N. R. Sinclair; vice-president, George W. Dunham, formerly president of the Society of Automotive Engineers and vice-president of the Militor Corporation; second vice-president, R. L. Notman, formerly vice-president of the McKinnon Dash Company; treasurer, E. O. Sutton, formerly treasurer of the Knox Motors Company. The general executive and sales offices of the Militor Motors Company are located at 111 Broadway, New York City.

Packard Acquires Aviation Field

Packard Motor Car Company has acquired a tract of land on the outskirts of Detroit for use as a private experimental flying field in the development of its aviation program. The field lies between Detroit and Mt. Clemens, almost midway between Morrow Field in northwest Detroit and Selfridge Field, near Mt. Clemens; it is large enough to permit of the landing of any kind of airplane; it is accessible by improved highway and interurban railway; and it is easily susceptible of improvements which will be begun at once to make it a model experimental field.

Lieut.-Col. J. G. Vincent, vice-president of engineering of the Packard Company, and one of the designers of the Liberty motor, is enthusiastic over the acquisition, which insures him and his staff facilities for proving out both engines and planes.

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Wheel Makers Honor Thos. A. White

Thomas A. White, St. Marys, Ohio, chairman of the Wheel Manufacturers' War Service Committee, and president of St. Marys Wheel and Spoke Co., consolidated with Crane & MacMahon, Inc., was signally honored and completely surprised in Chicago, Wednesday evening, April 16th, when the wheel makers of the country tendered him a testimonial dinner in the Florentine Room of the Congress Hotel.

As a token of appreciation of his services as chairman of the War Service Committee, he was presented with a solid gold Swiss watch, complete with gold chain and kife, engraved "Thomas A. White, from his Friends in the Wheel Industry, April 16, 1919." His nickname since then has been "What-Time-Is-It" White. The watch is a product of Patek, Phillipe & Co., Geneva and Paris.

Mr. White had no inkling of the dinner until on a pretext he was taken to the Florentine Room by two friends and thrust inside. The presentation was made by O. B. Bannister, Muncie, Ind., and Carl D. Fischer, Terra Haute, Ind., acted as toastmaster. Just prior to the presentation of the watch each guest presented an individual gift to Mr. White, accompanied by "nonsense" verse. Telegrams and letters from many absent friends, including a number of army officers and Government representatives at Washington, were also read.

Toasts were responded to by Ed. E. Parsonage, vice-president of Deers & Co., who was formerly chief of the Vehicle, Implement and Wood Products Section of the War Industries Board; by C. W. Hotchkiss, general manager of the Cleveland plant of the National Malleable Castings Co.; Harry D. Hartley, of the Pioneer Pole and Shaft Co., Piqua, Ohio; C. C. Carlton, of Prudden Wheel Co., Lansing, Mich.; Charles H. Burras, Chicago, and others.

Among those contributing to the testimonial to Mr. White were Archibald Wheel Co., Lawrence, Mass.; Auto Wheel Co., Lansing, Mich.; Avoca Wheel Co., Avoca, N. Y.; Bimel Spoke and Auto Wheel Co., Portland, Ind.; A. M. Eames & Co., Framingham, Mass.; Eberly & Orris Mfg. Co., Mechanicsburg, Pa.; W. A. Eberly Wheel Works, York, Pa.; Garman Wheel Co., Oxford, N. C.; Hoopes, Bro. & Darlington, West Chester, Pa.; Hayes Wheel Co., Jackson, Mich.; Imperial Wheel Co., Flint, Mich.; Phineas Jones & Co., Newark, N. J.; Kelsey Wheel Co., Detroit, Mich.; Mutual Wheel Co., Moline, Ill.; Muncie Wheel Co., Muncie, Ind.; New Wapakoneta Wheel Co., Wapakoneta, Ohio; Prudden Wheel Co., Lansing, Mich.; Owensboro Wheel Co., Owensboro, Ky.; Royal Wheel Co., Aurora, Ind.; Schwarz Wheel Co., Philadelphia, Pa.; Standard Wheel Co., Terre Haute, Ind.; Union City Wheel Co., Union City, Ind.; Zwick & Greenwald Wheel Co., Dayton, Ohio; National Malleable Castings Co., Cleveland, Ohio; Pioneer Pole & Shaft Co., Piqua, Ohio, and Hargrave A. Long, Chicago.

Besides Mr. White, the members of the Wheel Manufacturers' War Service Committee were Messrs. E. H. Archibald, Lawrence, Mass.; O. B. Bannister, Muncie, Ind.; Harry F. Harper, Lansing, Mich.; O. W. Mott, Jackson, Mich., and Hargrave A. Long, Chicago.

Sales Directed From Factory

A. E. Schafer, general sales manager of the Gramm-Bernstein Motor Truck Company, Lima, Ohio, has notified Gramm-Bernstein dealers in the Eastern territory that henceforth sales and service in that territory will be directed from the factory. Until recently this section had been in charge of C. F. Moody, as distributor, operating as the Gramm-Bernstein Sales Corporation, with offices at New York, Philadelphia, and Akron, Ohio.



A. E. SCHAFER
Sales Manager, Gramm-Bernstein Motor Truck Co., Lima, Ohio

Mr. Schafer was formerly with W. C. Durant in the organization of some of his properties, and with the Sherwin-Williams Co., directing a selling force of 225 men for the latter company. Mr. Schafer's success has been built upon his absolute fairness toward all with whom he has dealings, and his high conception of a correct merchandising policy.

Horizontal Hydraulic Hoist Co. Opens Detroit Office

The Horizontal Hydraulic Hoist Co., Milwaukee, Wis., manufacturers of horizontal hydraulic dumping units for motor trucks, has opened its general sales office at No. 456 Book Building, Detroit, Mich. The district offices at 345 Peoples Gas Building, and 35 Twenty-fifth Street, Milwaukee, and the factory in Milwaukee will be retained.

Frank H. Dewey has resigned his position as truck engineer of the Packard Motor Car Co., to become the sales engineer of the Horizontal Hydraulic Hoist Co., and will welcome all inquiries from users, dealers and manufacturers of motor trucks regarding the economical handling of materials with trucks.

Methodists Will Motor to Columbus

Transportation experts engaged in routing the various automobile caravans which will start for the great Methodist Centenary Celebration at Columbus, Ohio, June 20th to July 13th, estimate that 40,000 machines will convey approximately 175,000 visitors to the religious exposition.

One of the largest of these caravans, arrangements for which have been fully made, will start from Springfield, Ill. Dr. E. M. Antrim, Springfield, who has been chosen as caravaneer, has enlisted 1,000 automobiles for the tour.

Another large caravan has been organized by W. H. Cable, Council Bluffs, Iowa. This consists of almost 200 cars, and will start from the Hawkeye State early in June.

That the caravan idea is a popular one with automobile owners is evidenced by the fact that reports of the formation of new caravans are daily received at the Centenary Celebration headquarters, Columbus.

Because the automobile caravan is such an absolutely new thing preparations for its routing and accommodation were necessary. Experts were engaged to route the various caravans, special road maps have been made, lists of hotels and motor service made up and sent to 75,000 automobile-owning church members, and arrangements made at Columbus to park as many as 40,000 machines in a single day. Provisions also have been made for accommodations for auto parties along the way.

The automobile clubs of Columbus and Ohio are co-operating with Centenary Celebration officials, doing everything in their power to facilitate the delightful tours of these pilgrims to the modern Mecca.

As a great number of automobilists have expressed desires to make the trip to the celebration a sort of "outdoor vacation" the celebration management has arranged to have a "tent city" for the accommodation of those who wish to live in the open. Chaplain S. L. Martin, of the 148th Regiment, Thirty-seventh Division, has been placed in charge of this project. Chaplain Martin will have tentage for more than 50,000 persons. He also is arranging parking space for 20,000 machines close to the "tent city."

Every convenience will be provided for motorists at the celebration grounds. Repair shops, supply stations and garages are being placed at various points inside the exposition gates.

Fine roads and beautiful country, combined with twenty-four days of fascinating sightseeing at the celebration, with four Sundays upon which to choose a list of the greatest preachers in the United States appearing in the many churches of Columbus, will round out for the automobile tourist a summer's vacation always to be cherished in delightful memory.

General Motors Corporation, Chevrolet Division, has awarded a contract for the erection of an enameling and assembling building on the General Motors' property at Kingsland Point, Tarrytown, N. Y., to cost $500,000.

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A Page from Cincinnati

Co-ordinating Cincinnati's Industries

The new "Division of Manufacturers" of the Cincinnati Chamber of Commerce is now an assured fact. The objects of this new division is the co-ordination of industrial effort, and it is felt that added impetus to the movement will result from the active co-operation of existing organizations in the various branches of industry.

Some of the proposed functions of the division are: Co-ordination and concentration of industrial effort; co-operation with the Government; promoting welfare of community; reciprocal favoring of home industries and products; greater publicity for Cincinnati's industries in the markets of the U. S.; reorganization of Foreign Trade Bureau with enlarged service; careful consideration of proposed legislation affecting manufacturers; study of the relations between capital, labor and the public; expert advice regarding organization and conduct of employment and training departments; confidential counsel of experts as to employment of women; establishment of library of industrial information; public addresses by eminent business experts.

At a special meeting of the Board of Governors of the Cincinnati Carriage Makers' Club, on May 1st, at the Chamber of Commerce, Theodore Luth was unanimously elected to represent the vehicle industry of Cincinnati in this new Division of Manufacturers of the Cincinnati Chamber of Commerce.

• • •

Cincinnati Carriage Makers' Club

The May meeting of the Cincinnati Carriage Makers' Club has been eliminated, and P. P. Hunter, chairman of the Entertainment Committee, is working indefatigably for the celebration of the annual outing of the club, which will take place on Saturday, June 14th, in the form of a steamboat ride on the Ohio River. This boat trip is a long-looked for event by the members, and the Entertainment Committee promises some very interesting doings. This year's outing will eclipse all past events of the kind, and now that the war is over and Hooverizing is more liberal, Mr. Hunter has already made some elaborate arrangements for the entertainment for those who are fortunate enough to attend.

• • •

W. J. R. Alexander in South America

W. J. R. Alexander, the former popular secretary of the Carriage Makers' Club of Cincinnati, who sailed on February 6th on the steamer "Panama" for South America, in the interests of his house, Messrs. Beckwith-Chandler Co., carnish makers, of New York, was heard from in Santiago, Chile. Mr. Alexander writes very interestingly about his trip and states that South America is very agreeable, the climate is pleasant, traveling conditions reasonably good, and that business was coming his way.

Meeting of Vehicle Manufacturers

The carriage manufacturers of the United States met at the Hotel Gibson on May 14th and discussed the future welfare of the industry. The "standardization" question was again taken up. There were forty of the most prominent carriage builders present. A. H. Ahlbrand, Seymour, Ind. president of the Carriage Builders' National Association, and P. E. Ehrenz, St. Louis, Mo., chairman of the Executive Committee of the Carriage Builders' National Association, were active in the session.



CLEN PERRINE
President Cincinnati Carriage Makers' Club

Cincinnati Vehicle News Briefs

Luth Carriage Co. say they are enjoying a nice trade and the same reports come from the Phoenix Carriage Co. and the Brown Carriage Co.

• • •

The Standard Vehicle Co., Lawrenceburg, Ind., are now getting started for business and Mr. Knapp, the president of this concern, is placing his specifications for materials of all kinds. They are occupying the old James & Mayer plant, and have made extensive improvements.

• • •

The Monarch Carriage Goods Co. are having a fine trade. Henry Voss, manager of this concern, states they are rushed with orders.

• • •

The General Woodwork Co. are extremely busy and are turning out their truck cabs in large numbers.

• • •

The G. A. Schacht Motor Truck Co. have enough business booked to keep them going for many months.

• • •

The K-D Lamp Co. are working diligently to supply their customers.

• • •

The Edward F. Aalf Co. are humming with business.

The O. Armleder Co. are having a very satisfactory trade for their popular line of trucks.

• • •

The Trailmobile Co. are enjoying a splendid trade. This concern furnished the U. S. Government with trailers during the war and worked one hundred per cent Government business. Now they are prepared for the trade in general.

• • •

R. E. Friederich, of the Wheel, Top and Hardware Co., reports trade with his company as being very fine.

• • •

The auto top and painting establishments of Cincinnati are all enjoying a very busy season. The motor truck manufacturers in Cincinnati, including the body manufacturers, have no complaints to offer regarding business.

• • •

L. R. Vandusen, one of the best known young men in the vehicle trade of Cincinnati, is now associated with Buob & Scheu, in their sales department.

• • •

A. H. Ahlbrand, Seymour, Ind., who is the popular president of the Carriage Builders' National Association, was a recent visitor in Cincinnati.

• • •

A. S. Brown, Cincinnati representative of the Summit Thread Co., is convalescing after a severe operation.

• • •

The horse-drawn vehicle manufacturing trade in Cincinnati is very active and the factories all along the line are having a very satisfactory business.

• • •

W. H. Young, the affable Cincinnati representative of the Kelly-Springfield Tire Co., reports that the tire business with his concern is in excellent condition.

• • •

"Tony" Thies, of the Ed. F. Alf Co., is on the road for his concern.

• • •

Clarence Rennekamp, of the Auto Vehicle Parts Co., has been out of the city during the past month, visiting his trade.

• • •

John A. Creighton, of the Truscon Laboratories, Detroit, Mich., is enjoying a very nice business for his company.

• • •

C. F. Carpenter, of D. L. Carpenter & Co., left early in May for the South, and booked some very large orders.

• • •

Austin Levan, Harrodsburg, Ky., superintendent and buyer for the D. T. Bohon Co., recently was in Cincinnati and made purchases for his concern.

• • •

The Sayers & Scovill Co. are working full shift. Their popular "Sayers Six" automobile is a beauty and meeting with great favor throughout the country. E. E. Hess, of the company, states they anticipate erecting an additional factory to take care of their increasing business.

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If it "*looks*" like leather
If it "*feels*" like leather
If it "*wears*" like leather
It is COTEX

The Dependable

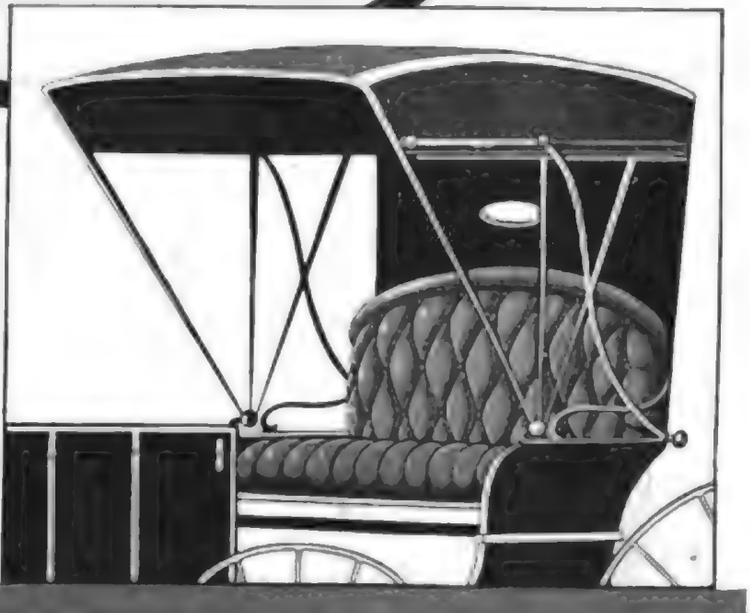
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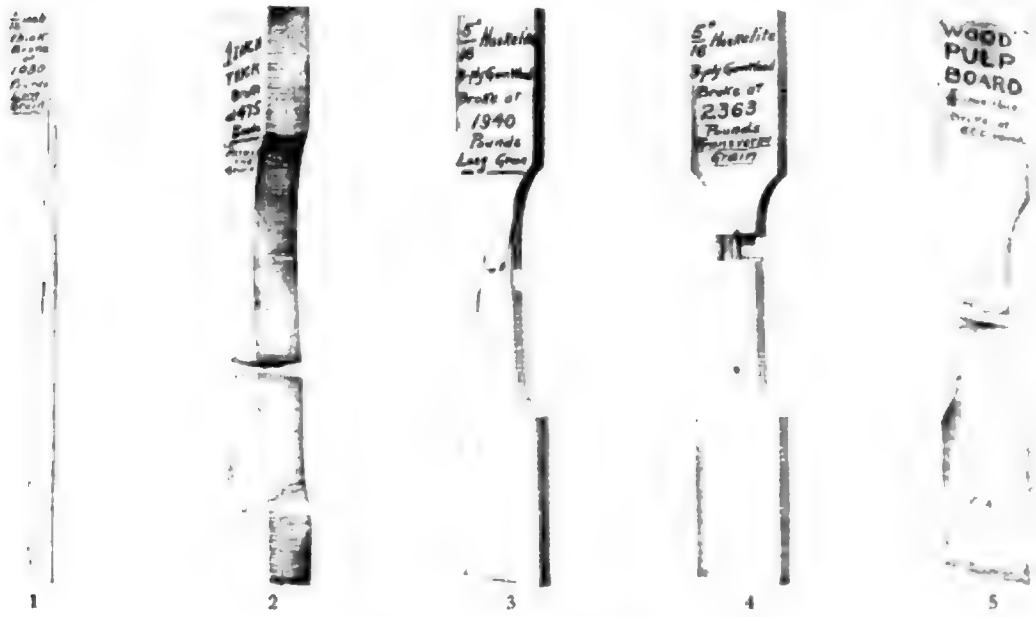
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Not boasts, but tests prove Haskelite

Haskelite, compared with plain wood and pulp board



1 2 3 4 5

Figure 1. A 1/12-inch strip of gum wood, longitudinal grain, broke under strain of 1080 pounds. Fracture shows strength of long fibre.

Figure 2. A 1-inch gum board, cross grain, broke at 475 pounds. No strength—long fibre not utilized.

Figure 3. A strip of Haskelite, 5/16-inch thick, of three plies cut along the face grain, broke at 1940 pounds, showing a strength of 6,200 lbs. per sq. in. A bar of Haskelite cut in this way, but one foot long and 1 inch square, weighs 0.236 pound, and has a strength per lb. per foot of length of 26,000 lb. per sq. in., as compared to 19,100 for steel. Note long-fibre fracture.

Figure 4. A strip of Haskelite 5/16-inch thick, cut across face grain, broke at 2,363 pounds, showing a strength of 7,500 lbs. per sq. in. Note long-fibre fracture.

Figure 5. A strip of 5/16-inch wood pulp board, broke at 600 pounds. Note sharp fracture, similar to Figure 2.

The Waterproof

HASKELITE

Mention THE VEHICLE MONTHLY when writing to advertisers.

though light as wood, as strong as steel!

THE tendency in automobile construction today is toward lighter cars. The manufacturer who succeeds in saving weight without sacrificing appearance and quality, saves many dollars per pound.

He is learning that Haskelite can be economically used for Roofs, Side Panels, Instrument Boards, Dashes, Running Boards, Door Panels, Heel Boards and Complete Truck Cabs, not only with great saving in weight, but with distinct advantages in appearance and positive improvement in quality.

Metal has never been altogether satisfactory; pulp board has to be so built up and structurally reinforced that it is no more substantial than a picture in its supporting frame.

Haskelite solves the problem by its waterproof mouldable properties, its amazing range of finish and its strength.

Behind Haskelite are thousands of scientific tests performed by our research laboratory, of which the following table is an example.

Average results of 155 tensile tests made by HASKELITE RESEARCH LABORATORY on specimens one inch wide.

Material	Direction of Grain	Thickness, In.	Number of Tests	Tensile Strength Lb. per Sq. In.
HASKELITE	Longitudinal	0.139	8	5950
Paper Pulp	"	0.197	8	1821
HASKELITE	"	0.214	8	5400
Paper Pulp	"	0.204	8	2076
HASKELITE	"	0.267	8	6000
Wood Pulp	"	0.279	7	1731
HASKELITE	"	0.326	8	6000
Wood Pulp	"	0.307	6	2011
HASKELITE	"	0.388	8	4410
Wood Pulp	"	0.423	8	1709
HASKELITE	Transverse	0.139	8	4460
Paper Pulp	"	0.197	8	948
HASKELITE	"	0.214	8	7000
Paper Pulp	"	0.204	7	957
HASKELITE	"	0.267	8	4800
Wood Pulp	"	0.279	8	1618
HASKELITE	"	0.326	8	4620
Wood Pulp	"	0.307	7	2067
HASKELITE	"	0.388	8	5610
Wood Pulp	"	0.423	8	1714

Full information, specifications and working data, as well as tests of "Haskelite Moulded Ribless Tops" will be gladly furnished from our offices. HASKELITE MANUFACTURING CORPORATION, Chicago—Chamber of Commerce Bldg. New York—Equitable Bldg., 120 Broadway.

Mouldable Plywood

HASKELITE

Color Mixing

(Continued from page 50)

Lilac Tint—White, 80 parts; ultramarine blue, 1 part; carmine No. 40, 1 part.

Lilac Tint, Cheap—White, 40 parts; English rose pink, 1 part.

Limestone—White, ochre, lampblack and Indian red.

Limestone Tint—White, 18 parts, golden ochre, 1 part.

Mahogany—Golden ochre, 5 parts; Venetian red, 2 parts.

Maroon—Carmine, yellow chrome and burnt umber; or, carmine or crimson lake and burnt umber.

Mauve Tint—Zinc white, 12 parts; cobalt blue, 4 parts; carmine lake, 1 part.

Mexican Red—Venetian red, 4 parts; red lead, 1 part.

Moorish Red—Aniline vermilion, 3 parts; rose pink, 1 part.

Naples Yellow—White, 160 parts; golden ochre, 9 parts; orange chrome 1 part.

Ochre, Roman—Ochre, 15 parts; burnt umber, 1 part.

Old Gold—White, 10 parts; golden ochre, 1 part; raw umber, 1 part.

Olive Drab—White, 75 parts; raw umber, 13 parts; medium chrome green 7 parts; drop black, 5 parts.

Olive Green—French ochre and lampblack.

Olive, Light—White, 70 parts; ochre, 15 parts; medium chrome yellow, 5 parts; raw umber, 6 parts; drop black, 4 parts.

Olive Ochre—French ochre, 7 parts; raw umber, 1 part.

Opaque Crimson—Carmine, 2 parts; English vermilion, 1 part.

Orange—Orange chrome yellow; or red and yellow chrome.

Orange Ochre—Yellow ochre, 7 parts; Venetian red, 1 part.

Orange, Pale—White, 6 parts; orange chrome yellow, 1 part.

Orange, Red—Deep orange chrome yellow.

Orange Tint—White, 1 part; orange chrome yellow, 1 part.

Orange Vermilion—Orange mineral.

Oriental Red—Indian red, 2 parts; red lead, 1 part. (See also Imperial Orange Red.)

Peach—Tint white with ochre, vermilion and purple brown.

Peacock Blue—White, 90 parts; light chrome green, 5 parts; ultramarine blue, 4 parts; drop black, 1 part.

Pearl—White, vermilion, Prussian blue; tone with black.

Pearl Gray—White, 98 parts; drop black, 1½ parts; Tuscan red, ½ part.

Primrose—Medium chrome yellow.

Pink—(See also Brown Pink, Fawn Pink, German Pink).

Frank S. Corlew Manages New England Vulcan Branch

Frank S. Corlew, one of the most prominent and aggressive men in the automobile industry is now manager of the New England branch of the Jenkins-Vulcan Spring Company. Mr. Corlew was quick to realize the commercial possibilities of the product of the Jenkins-Vulcan Spring Company,



FRANK S. CORLEW
New England Representative for The Jenkins-Vulcan Spring Co.

Richmond, Ind., with relation to the New England territory. An appreciation of the established reputation of this company, combined with resources of a most staple character, was responsible in a great measure for his decision to direct the activities of the Jenkins company in New England. The New England branch is located at 819 Boylston Street, Boston, Mass., where ample facilities to handle the constantly increasing volume of business will be maintained.

After a varied automobile sales experience Mr. Corlew comes to the Jenkins-Vulcan Spring Company, and aggressive as well as progressive methods, for which Mr. Corlew is well known will be the policy upon which a greater distribution and more thorough appreciation of the Jenkins-Vulcan Spring Company will be founded.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue

AGENCY WANTED. A capable business man with an exceptionally thorough knowledge of the automobile body business wants the Western agency of a high-class Eastern body builder. Address "——," care "THE VEHICLE MONTHLY," Philadelphia.

AGENCIES WANTED. London company with good connection amongst body builders throughout the United Kingdom and requiring a staff of travellers are desirous of obtaining agencies for sundries. References exchanged. Address "——," care "THE VEHICLE MONTHLY," Philadelphia.

AUTOMOBILE AND CARRIAGE Body builders, color carmakers, varnish cubbers, cushion and trimmers. This company offers unusual opportunities for maximum wages and steady year-round employment under piece work and contract terms for skilled workmen with good experience on high grade closed bodies. For further particulars address, stating experience, NEW HAVEN CARRIAGE COMPANY, New Haven, Conn.

AUTOMOBILE TRIMMER wanted. We have an exceptional opportunity to offer a first-class all-around man. This is a steady position and a fine opportunity for advancement. Good wages. Address "——," care "THE VEHICLE MONTHLY," Philadelphia.

FOREMAN PAINTER WANTED. First-class man experienced on fine work for large automobile body shop in Middle West, doing repairing and building new bodies. Give details where worked, experience, salary wanted. Good position for right man. Confidential. Address "21," care "THE VEHICLE MONTHLY," Philadelphia.

DRAFTSMAN, experienced on tool and die designing, for an out-of-town automobile body concern. State experience and salary expected. Address "20," care "THE VEHICLE MONTHLY," Philadelphia.

OPEN BODY DRAFTSMAN, experienced on production drafts for an out-of-town automobile body concern. State experience and salary expected. Address "——," care "THE VEHICLE MONTHLY," Philadelphia.

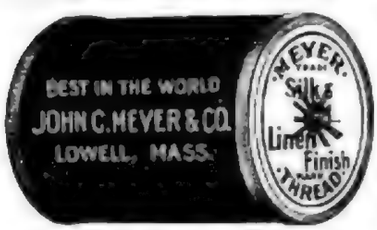
SALESMAN wanted to cover Eastern States and Middle West to Denver, Michigan, on salary and commission. Southern States on commission. State territory preferred. Auto cloths experts on old established house. State experience, references, age and salary. Address "230," care "THE VEHICLE MONTHLY," Philadelphia.

TWO MECHANICAL DRAFTSMEN, experienced on body hardware, for an out-of-town automobile body concern. State experience and salary expected. Address "200," care "The VEHICLE MONTHLY," Philadelphia.

WANTED.—Automobile body draftsman and designer, high-grade production. Address BLUE RIBBON BODY CO., Bridgeport, Conn.

WANTED.—Experienced automobile body mill man, with ability to serve as foreman. Address Box 555, Ogden, Utah.

WANTED. A working foreman to take charge of our body department. Must be competent to lay out work on production lines and to teach others to do the work. Good opportunity to right man. Address with references, age and experience, W. R. LANTZ MFG. & SUPPLY CO., Muskogee, Oklahoma.



For Automobile and Vehicle Trimming. No other so good. Abolish stitching room troubles and produce more work. *Samples Free.* For Auto Trimming use F16—EE18—E20. For Hand Sewing use G2.

Meyer Thread

JOHN C. MEYER THREAD CO. **LOWELL, MASS.**

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IT BRINGS BUSINESS

Body Builders will find users of dumping trucks very enthusiastic over a demonstration of the

TRADE HORIZONTAL HYDRAULIC MARK **Dumping Unit**

Get an agency and secure two profits—a very liberal one on the Unit and your regular profit on the body which you can build.

The Horizontal Hydraulic Dumping Unit enables full length bodies to be used, the usual 18" of waste loading space just back of seat being saved.

No ropes, rope clips or sheaves required. No interference with ground clearance of chassis.

No portion of hoist higher than chassis seat.

Write for further interesting particulars



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OF GUARANTEED ACCURACY

For Automobiles, Motor Trucks and Special Work

We also make a large line of Drop Forged Carriage and Wagon Hardware

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Send your Models or Blue Prints for Quotations
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FOUNDED 1880
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TEMPERING POWDER

INVALUABLE for tempering all finished tools, such as, Milling Cutters, Drills, Taps, Cutters, Reamers, Punches, Dies, Spindles, Boring Tools, Chisels and all tools requiring excessive hardness.

Tempers iron to the hardness of steel. Make mild steel as hard as the hardest tempered steel. Gives carbon steel a greater hardness than can otherwise be obtained.

This powder can be used for a hundred different purposes; no matter what you may be tempering, you can secure a greater and more uniform hardness, than by any other known process; besides, it has the immense advantage of retaining flexibility.

Not only does this apply to small tools enumerated above, but particularly to lathe, planer tools, etc.

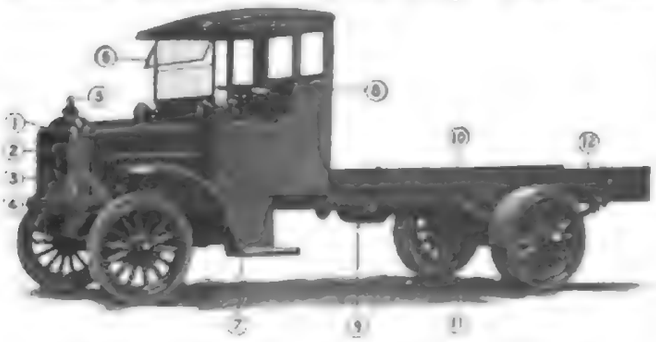
It can be used profitably on all grades of steel from the ordinary Open Hearth to the highest grade of Crucible steel. Should be in every Blacksmith, Machine or Auto Repair Shop.

Handled by all Active Dealers, Sample Free on Request

The Phillips-Laffitte Co.
Pennsylvania Building Philadelphia

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First Completely Equipped Line of Heavy Duty Trucks



2-ton, Worm-drive—$2700 —No Extras

Built by B. A. Gramm

In price this two-ton Gramm-Bernstein —completely equipped as shown— is under the average asked by 61 manufacturers for stripped chassis only

Not an extra to buy. Equipment includes:

① Sturdy radiator guard, attached to frame independently of radiator—the Gramm-Bernstein type adopted for Liberty Trucks.

② Radiator shutter, operated from dash.

③ Rear radiator shroud devised by B. A. Gramm, and adopted for Liberty Trucks, to promote cooling efficiency.

④ Pig-tail towing hooks at front end.

⑤ Motometer, to indicate temperature of engine.

⑥ Exceptionally rugged ventilating windshield.

⑦ Front fenders and steps.

⑧ Standard Gramm-Bernstein cab, with doors and winter curtains.

⑨ Transmission is the patented Gramm type, with gears always in mesh, assembled on a six-spline shaft, without a single bolt, nut, stud, set-screw, pin, key or anything else liable to work loose and fall out. A highly valuable, exclusive feature.

⑩ Body sills of seasoned ash, ready for mounting the body.

⑪ Patented wick oilers on all spring bolts.

⑫ Spring drawbar at rear end, supported by extra cross member.

On account of engagement by means of dog-clutches, the transmission gears *cannot be stripped.* Absolutely proof against a driver's carelessness. Cannot get out of alignment.

All Gramm-Bernstein 2, 2½, 3½, and 5-ton worm-drive models are now completely equipped as noted.



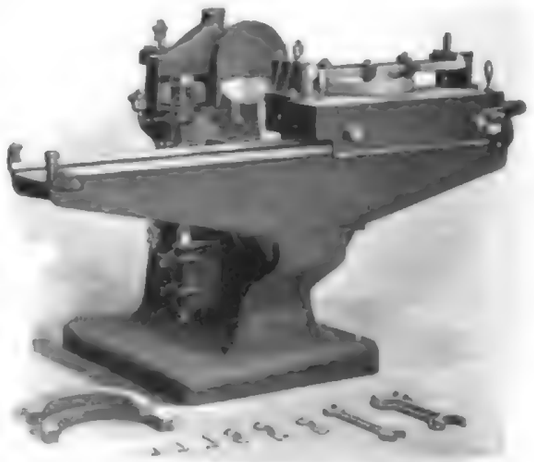
Many Gramm-Bernstein Trucks are being sold with dump bodies for use in road-building, public works and general building operations.

Dealers and users, in purchasing motor trucks and passenger cars with any kind of power take-off for operating hoist, winch, log-roller, tire pump, etc., should assure themselves that such device does not infringe upon B. A. Gramm's basic patent No. 1194994.

GRAMM BERNSTEIN

The Gramm-Bernstein Motor Truck Company, Lima, Ohio, U.S.A.—Pioneers Since 1901 Builders of the First Liberty (U.S.A.) Truck

Steering Wheel Rim Equalizer and Jointer



DEFIANCE

STEERING WHEEL RIM MACHINERY

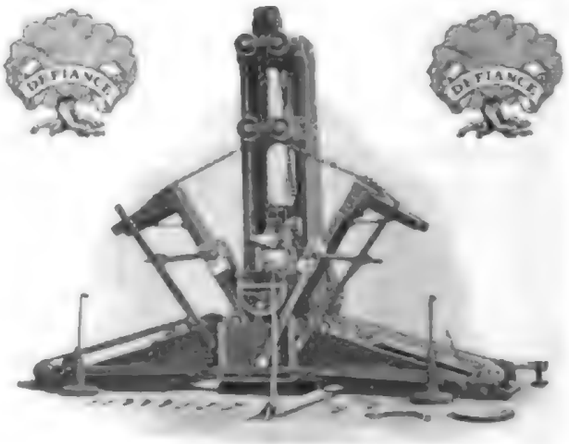
There's a Defiance machine for every operation necessary to make steering wheel rims. Beginning with blanking the stock—it bends the half rim sections—equalizes and joints the half rim sections—shapes the jointed rim—scrapes and polishes the shaped rims.

Each machine is of a special design, which in use has proven itself successful by accomplishing its respective operation accurately with a big daily out-put, and in addition reduces material wastage to a minimum. These machines are illustrated and described in circulars, which we will mail on request.

THE DEFIANCE MACHINE WORKS

Defiance, Ohio, U. S. A.

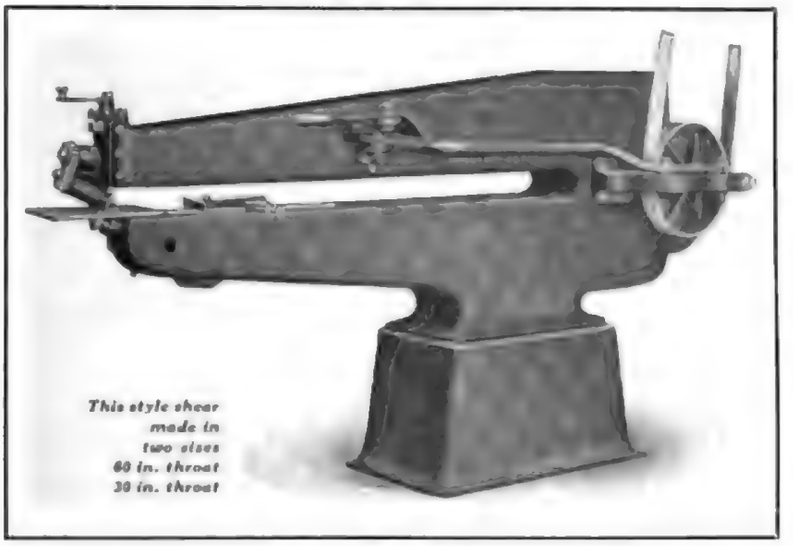
NEW YORK *LONDON*



Steering Wheel Rim Bending Machine

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The Solution of Your Cutting Problem



This style shear made in two sizes 60 in. throat 30 in. throat

WILL CUT SHEET METAL IN ALL GAUGES UP TO 16 GA. NO BURR ON EDGES AFTER WORK COMES FROM MACHINE. CURVES, REVERSE CURVES, CIRCLES, ETC., CUT WITHOUT THE LEAST CRIMPING OF THE METAL.

CIRCLE CUTTING ATTACHMENT FURNISHED AS EXTRA EQUIPMENT.

PETTINGELL MACHINE COMPANY : Amesbury, Mass.

Trailmobile

Trade-Mark Reg. U. S. Patent Office

Dealers Are Growing With Us—Fast!

The Motorless Motor Truck

Thousands in Use

SIZES
1,250 lbs.
1,500 lbs.
2,000 lbs.
3,000 lbs.
7,000 lbs.
10,000 lbs.
Also semi-trailers

Bodies for every business.

THE Trailmobile idea is spreading all over the country. Thousands now in use. Practically every truck owner and many passenger car owners in your territory are Trailmobile prospects—and some will buy two, four or six for every truck or car they own.

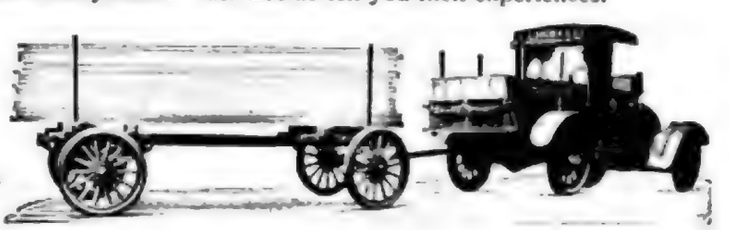
Trailmobiles are now used in the widest variety of businesses. Trailmobile economy is so great the Trailmobile will soon be used in most hauling. Wonderful records in every-day use are making the Trailmobile a ready seller.

Trailmobile sales give you the same margin as on the most sought for passenger cars and trucks. There is no service expense. Your efforts are aided by a big national advertising campaign that thoroughly covers the market, liberal assistance in local newspaper advertising, intensive circularization of *your* prospects, and close cooperation from our own selling organization.

Good dealers everywhere are growing with us. Let us tell you their experiences.

We want dealers where we are not now represented. If your record proves your energy and ability, write now, or wire for the details.

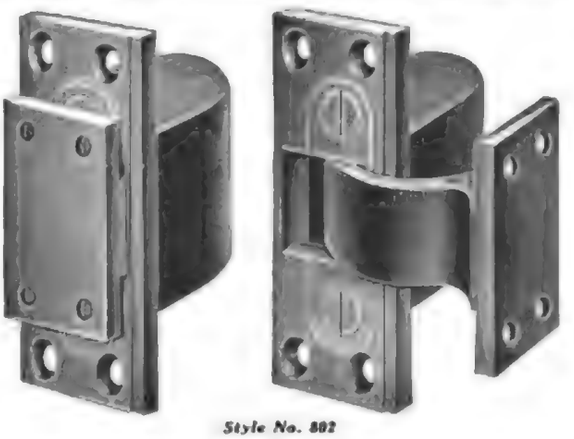
The Trailmobile Company
574 E. Fifth Street, Cincinnati, O.
Contractors to the U. S. Gov't



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About Concealed Hinges



Style No. 882

WE HAVE manufactured for years a Concealed Hinge with drop forged steel hook, and a drawn brass non-rusting case. One of our designs is shown in the accompanying illustration, and we desire to inform the trade that all Concealed Hinges we make are fully protected under U. S. Patents owned by us. We will protect all users of our Automobile Door Concealed Hinges, or for that matter on any other goods which we may manufacture and offer to the trade.

The English & Mersick Company
New Haven, Conn.



Hand Hoist for Ford Truck

TAKES no room back of cab, is easy of operation, simple and neat in appearance.

Shipped on sub frame, ready for mounting on chassis. Easiest for the body builder to install and best—because it always makes a satisfied customer.

Write for photos and blueprints.

Truck Engineering Company
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CLEVELAND, OHIO

"QUICKWORK" MACHINERY

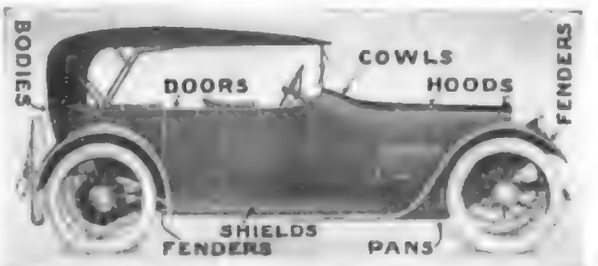
MAKES ALL THE SHEET METAL PARTS OF AUTOMOBILES

AEROPLANES, GEAR-GUARDS, VENTILATING, SHAVINGS AND DUST COLLECTING SYSTEMS, BLOWERS, TANKS

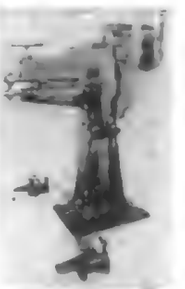
STEAM BOILERS, STEEL CARS, AGRICULTURAL MACHINERY, CARRIERS, SKYLIGHTS AND GENERAL SHEET METAL WORK

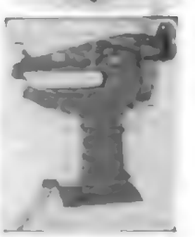












"QUICKWORK" MACHINES

Do first-class work with second class help, and do things not possible with any other equipment. Large production manufacturers use them because they turn out the LARGEST VOLUME at the LOWEST COST; and high-grade custom manufacturers use them because they do the BEST work.

"QUICKWORK" Machines have become standard, replacing ordinary equipment throughout the world. There are over 30 different "QUICKWORK" Machines—the most complete, uniquely—effective, cost-reducing, quality—improving line of sheet metal working machinery in existence.

Write at once for full information

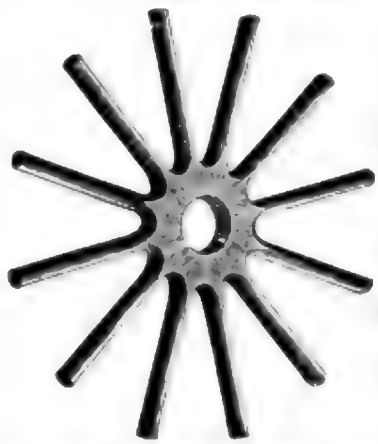
THE QUICKWORK COMPANY H. COLLIER SMITH, Pres. and Genl. Mgr.
ST. MARYS, OHIO

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Made Worth While by



SCHWARZ WHEEL SPIDERS

They eliminate the nuisance of taking out damaged spokes and inserting new ones.

Just apply felloes and metal rim and job is complete.

Write for Further Particulars and Prices

SCHWARZ WHEEL CO.

FRANKFORD, PHILADELPHIA

Drop Forge It



"Stiles" Automatic Friction Roll Drop Hammer

YOU'LL save money, time, labor and have a carriage, wagon or motor part that is stronger and better looking than any casting.

We make **Drop Forging Machinery** to meet all requirements, also Presses for Metal Stamping.

Let us send you descriptive matter covering your particular requirements. Write today.

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Wheels for Trailers and Automobiles

Hickory Nut and Acorn Brands

Medium and Heavy Sarven with Tires.

Artillery types—Light to Heaviest sizes with Steel or S. A. E. Bands.



Noted for quality, workmanship and seasoned stock.

Prices quoted on receipt of full specifications.

Crane & Mac Mahon, Inc.

St. Marys, Ohio — **8 Bridge Street, New York City**

The Answer

TO THAT TRAILER AXLE QUESTION IS

The Concord Plain Bearing Axle

It has proven its worth in actual trailer service. Made for light, medium and heavy work.

We can deliver promptly. Write for particulars.

CONCORD AXLE COMPANY - PENACOOK, N. H.

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Giant strength and perfect shape distinguish it.

Round and square sections for every purpose.

Increases the margin of safety wherever used.

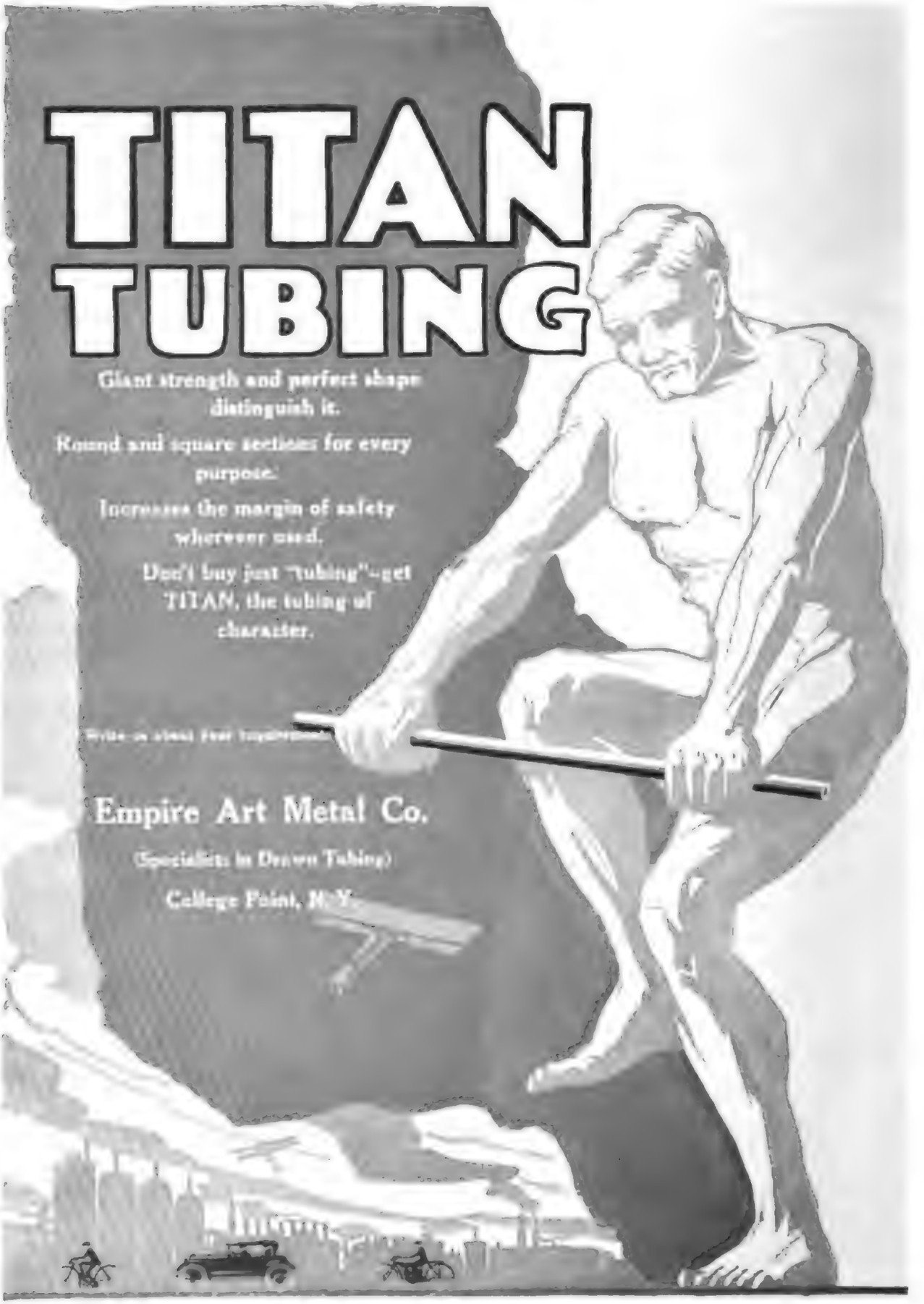
Don't buy just "tubing"—get TITAN, the tubing of character.

Write us about your requirements

Empire Art Metal Co.

(Specialists in Drawn Tubing)

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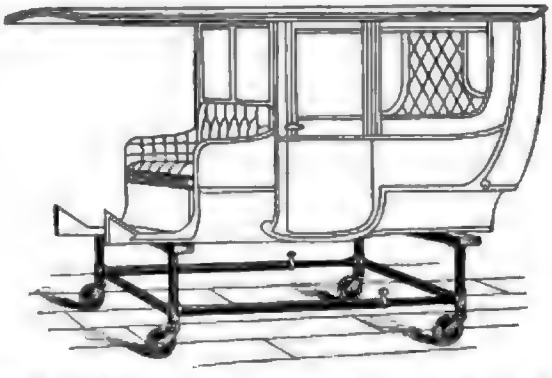


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YOU are not surprised at the uniformly high quality of EMPIRE Bolts and Nuts when you know the character of the house that produces them.

Three plants—at Port Chester, at Pemberwick and at Rock Falls—are busily engaged supplying the needs of the world's biggest industries: a privilege won by 74 years of service.

RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
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EXTENSION BODY TRUCK

Will add to your facilities in Handling Work in the Wood, Smith, Paint and Trim Shop.

It is indestructible and soon pays for its cost

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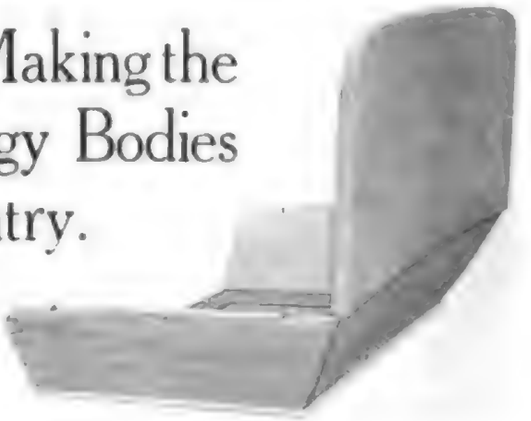
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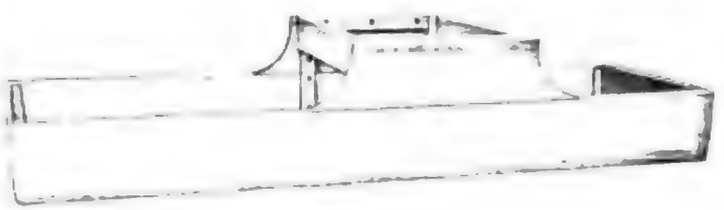
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Our Products are Quality. Deliveries Always Prompt and Our Prices Attractive

We Solicit Inquiry and Will Quote Promptly



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INCORPORATED

Successor to CARRIAGE WOODSTOCK CO.

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Truck Dealers and Manufacturers

Do you make your own Commercial Bodies?

We specialize on "Up to the Minute" truck bodies of all types. Ford truck and delivery bodies carried in stock.

Ask for catalog and prices on special bodies

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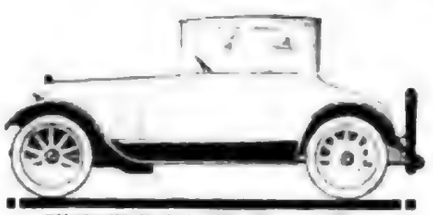
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OUR War Work will be done soon. Our designers are ready NOW to co-operate with you. Our factory is fully equipped with modern machinery and best mechanics. We build the highest grade Auto Bodies, in the white and complete. We have sufficient materials on hand for a large order, and our shipping facilities are the very best.

THE LANG BODY COMPANY

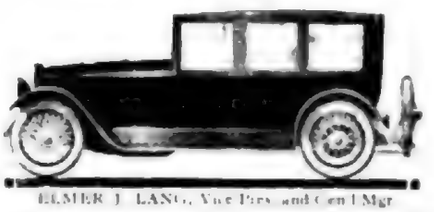
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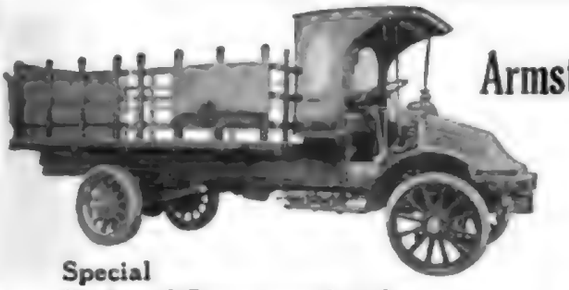
CHARLES E. J. LANG, Pres. and Treas.

CLEVELAND, OHIO

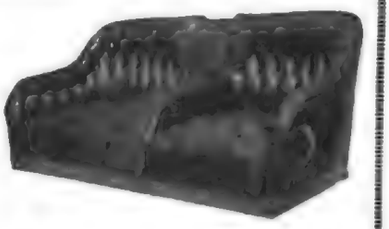


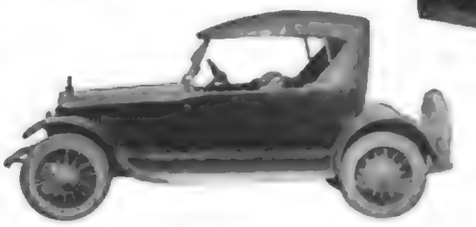
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COLUMBUS, OHIO





Special Designed Commercial and Pleasure Car Bodies

Send blue prints and specifications for estimates

TRUCK SEATS
SEAT BASES
CAB TOPS

Our facilities permit us to accept additional orders for

AUTOMOBILE CLOSED BODIES
(Aluminum)

in reasonable quantities for fall and winter delivery.



Founded in 1845, our long experience and established reputation in the manufacture of vehicle bodies guarantees our responsibility and the quality of our work.

H. H. Babcock Company **Watertown, New York**

COLUMBIA WAGON CO.

COLUMBIA, PA.

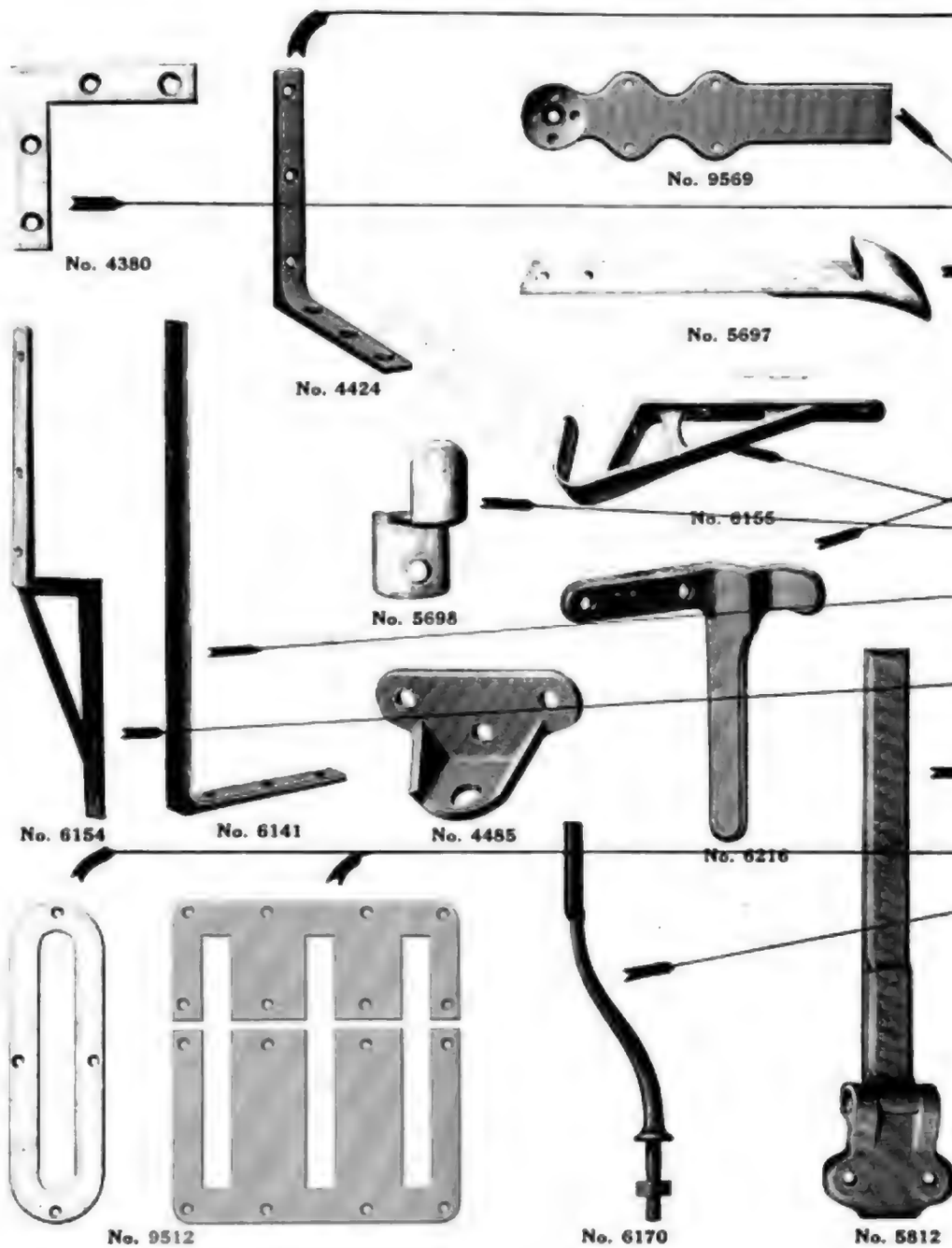
WE have completed our contracts with the Government and are now back to normal conditions. We hope to hear from our trade. Our new price lists are ready to send out.

We have been doing our best to serve our customers, but, owing to our part in aiding Uncle Sam win the war, we could not always make deliveries when promised. However, you can count on us hereafter to furnish promptly the well known COLUMBIAN BODIES for motor trucks and our general line of wagon work.

Catalogs upon request

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EMCO
Quality
Insures
Service

Write
for our
Bulletin
"Assembli
of Irons"

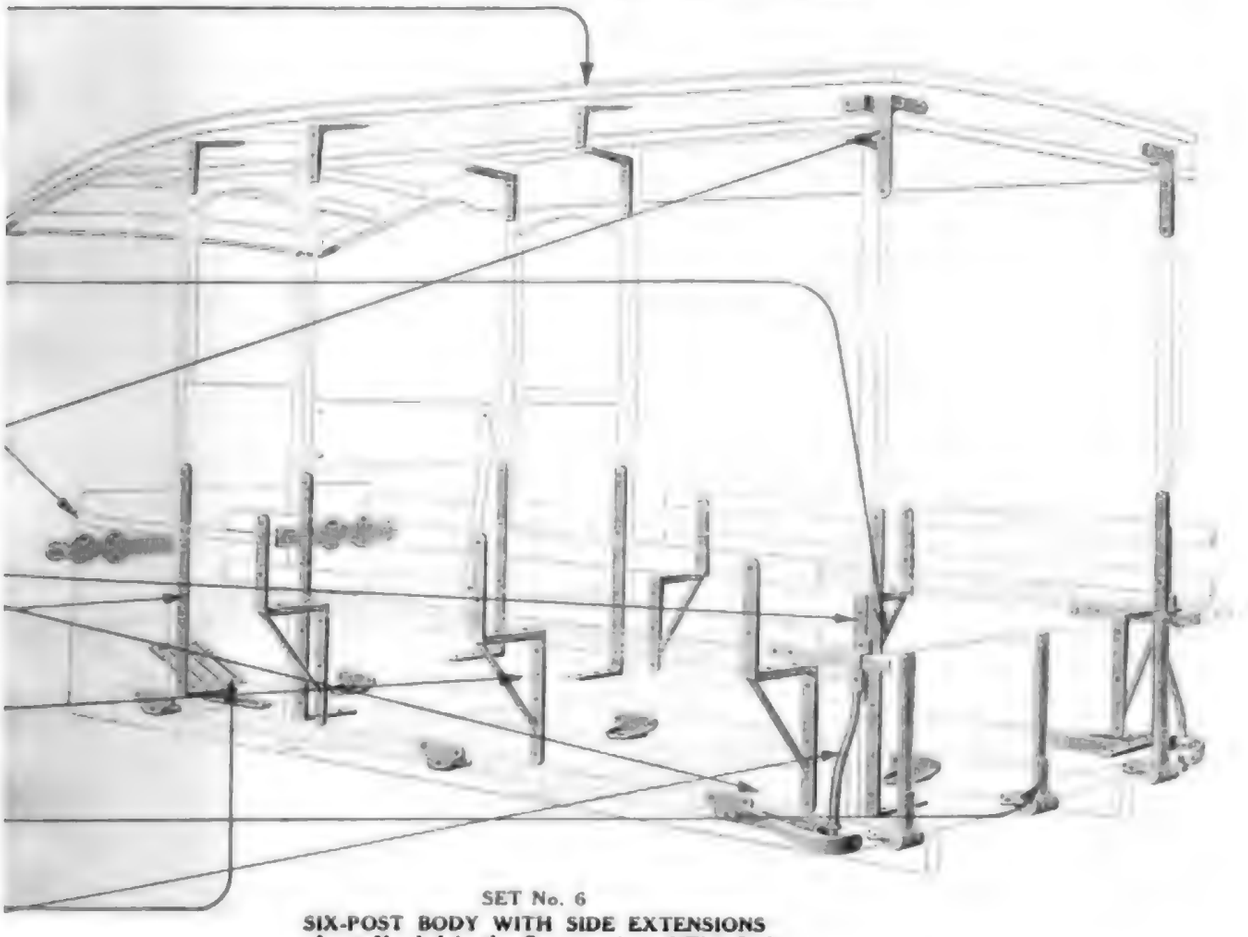
Side exten
Post cover
Endgate ...
Body brac
Endgate ...
Endgate ...
Rear post ...

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E

ABLE IRONS



SET No. 6
SIX-POST BODY WITH SIDE EXTENSIONS
Irons Needed in the Construction of This Body

	Size A 10" Side Panel 3½" Side Extension		Size B 12" Side Panel 7" Side Extension	
races	6 pieces	No. 6154-A	6 pieces	No. 6154-B
	6 pieces	6141-C	6 pieces	6141-C
	3 pieces	5812-B	3 pieces	5812-D
	2 pieces	6170-A	2 pieces	6170-D
	1 pair	5697-E	1 pair	5697-E
ds	2 pieces	5698-A	2 pieces	5698-A
ner irons	1 pair	6216-C	1 pair	6216-C

	Size A 10" Side Panel 3½" Side Extension		Size B 12" Side Panel 7" Side Extension	
Roof rail corner irons	6 pieces	4424-C	6 pieces	4424-C
Top rail corner plates, front	2 pieces	4380-B	2 pieces	4380-B
Foot board plates	1 set	9512	1 set	9512
Dash lamp brackets	2 pieces	9569	2 pieces	9569
Body and chassis connections	6 pieces	4485	6 pieces	4485
Sill braces	1 pair	6155-A	1 pair	6155-A

Note — No. 5546 or 5547 Curtain Hooks and Rings may be used on this body when furnished with curtains.

EBERHARD MANUFACTURING CO.

CLEVELAND, OHIO

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Practical knowledge and advice, complete equipment for turning out volume with the right service are the assets of this department.

With years of experience in the "Specialty" line, we are well adapted to care for your needs. We suggest communication with the

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Wherever the smoothly gliding car of elegant distinction is seen—there too are

SOSS INVISIBLE HINGES

Refinement of body design depends upon beauty of line. The unbroken beauty of line requires Soss Hinges.

Soss Hinges are mechanically accurate. They insure

Flush Doors, Clean Lines, No Projections

Catalog "B" and discounts on application.

SOSS MANUFACTURING CO
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C. COWLES & COMPANY

New Haven Conn.

ESTABLISHED 1838

HARDWARE, MOUNTINGS AND TRIMMINGS

Everything for Limousines and Landaulettes

Rubber-Covered Handles; Ventilators; Disappearing Corner Lights; Dome and Pillar Lights; Electric Cigar Lighters; Security Locking Handles; Concealed Toilet Cases; Curtain Rollers; Speaking Tubes; Mechanical Window Lifts; Anti-Rattlers; "Bunner" Window Locks; Tail Lights; Filled Moulding, etc.

CURTAIN FASTENERS—All styles and finishes.
BRANDS: SUCCESS, IDEAL, PERFECT, BREWSTER, EXCELSIOR.

STOWE NAME PLATE and ENGRAVING CO.

CHICAGO ILLINOIS

Manufacturers of

Etched Name Plates

For Automobiles, Carriages and Machines

SKELETON RADIATOR SIGNS | DASH and SILL PLATES



Above illustration shows the "SEARS CROSS LOCK" (as magnified) installed on door of a closed body

"SEARS-CROSS LOCK"

FOR AUTOMOBILE DOORS

"The Lock With The Expanding Latch"

(Manufactured under the Ottinger Patents)

MOTOR CAR manufacturers and body builders realize the need of greater lock efficiency. "The Lock With The Expanding Latch" embodies in its construction and functions every point which the ordinary door lock lacks. IT PREVENTS RATTLING OF DOORS—INSURES POSITIVE SAFETY PROTECTION AGAINST DOORS OPENING ACCIDENTLY—OVERCOMES PRESENT DIFFICULTY IN OPENING AND CLOSING OF DOORS—AND AUTOMATICALLY TAKES UP WEAR.

The outward pressure of the rubber stops is taken care of by the inward pressure of the Expanding Latch which holds the doors tight so that they cannot rattle. The holding pressure is supplied by the lock and not by the rubber stops.

The only perfect automobile door lock. Brings about economy in cost of installation. Made for all priced cars, open and enclosed bodies.

SEARS-CROSS CO.

Bush Terminal, Brooklyn, N. Y.

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NEW YORK, U. S. A.

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UZATONA RED

in four shades, ground in either our Japan, Varnish or Oil. This color is adaptable for Automobile, Carriage and Sign Painters' use, and is the strongest and most brilliant red made and permanent to light Quality same as before the war.

SEND FOR NEW COLOR CARD AND PRICES

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EDWARD SMITH & CO.

Carriage Varnishes

92 Years' Experience in Every Can

E.S. 1827 & CO.

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Everything from the Bare Wood to the Finishing Coat

KEYSTONE SPRING WORKS, INC.

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Springs for Motor Trucks, Wagons and Pleasure Cars

Thirteenth and Buttonwood Sts. ESTABLISHED 1870 Philadelphia, Pa., U. S. A.

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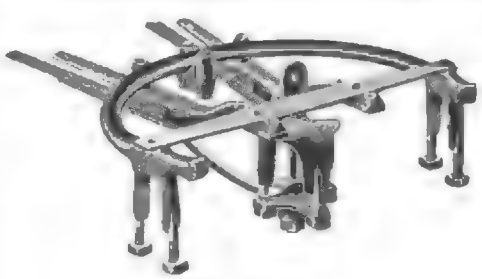
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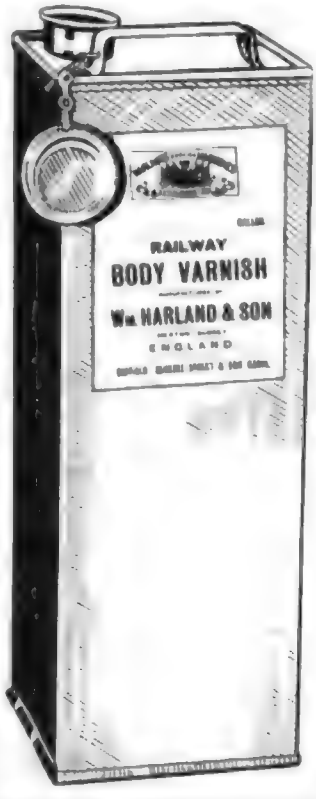
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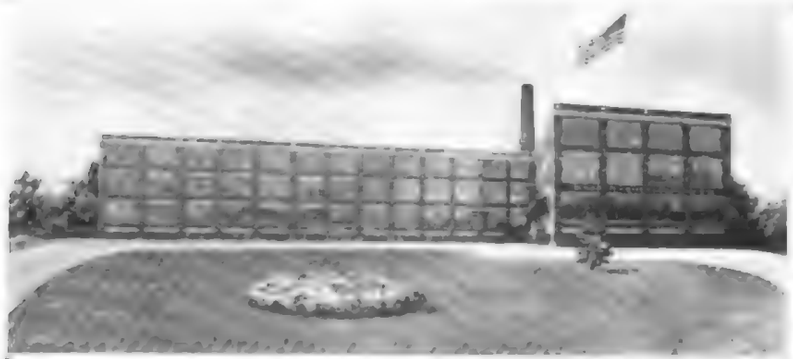
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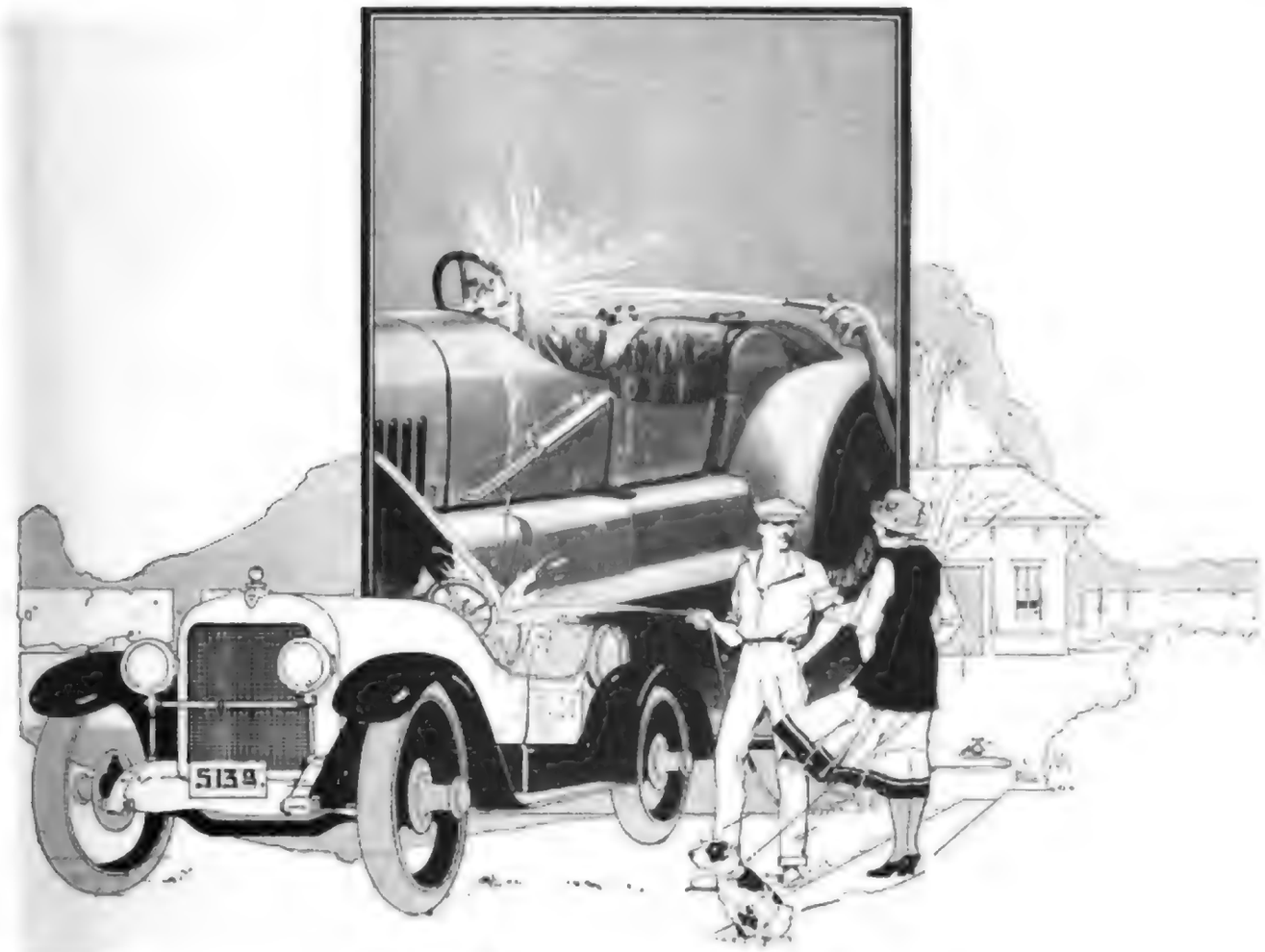
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CHASE

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Beautiful and thoroughly dependable fabrics that will give complete protection and satisfy the most critical user. Samples will convince you.

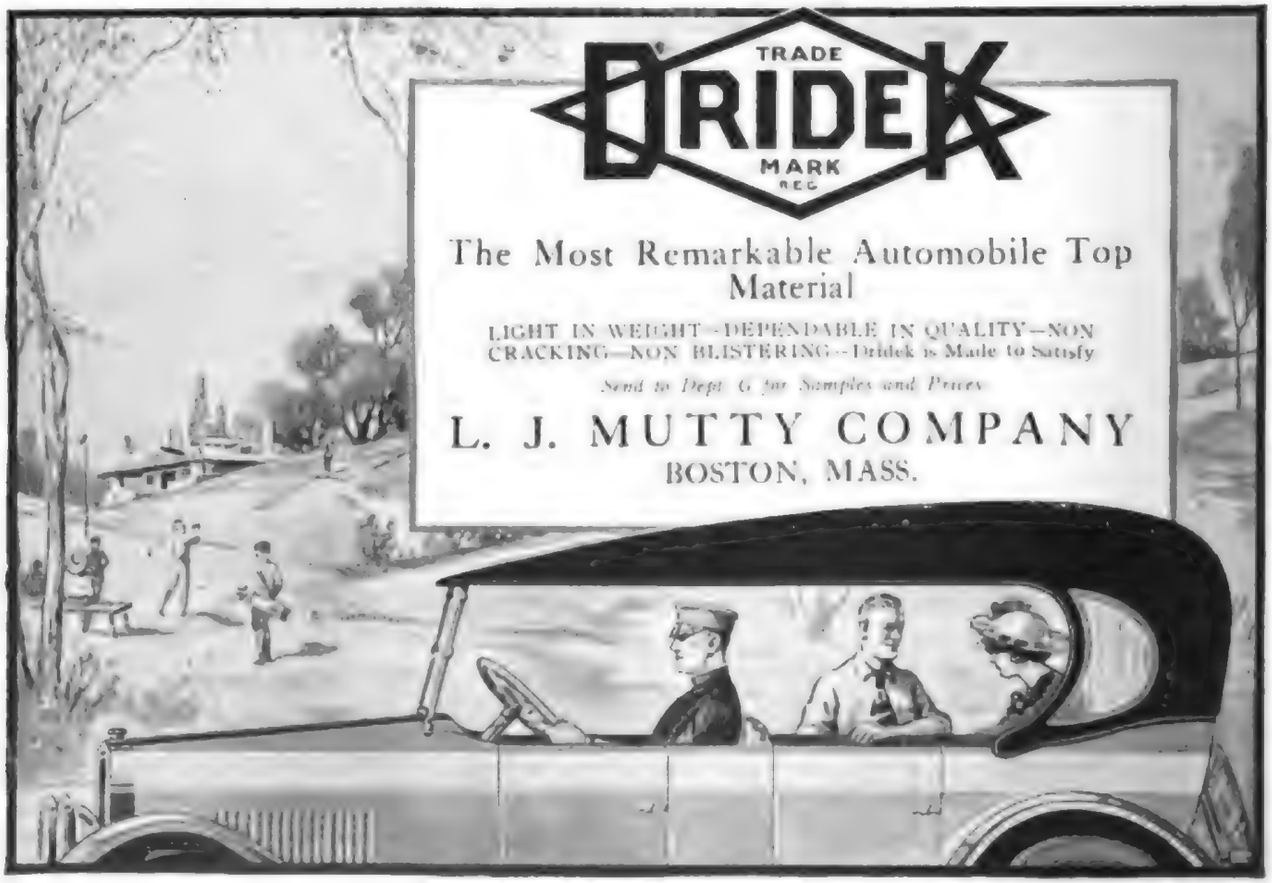
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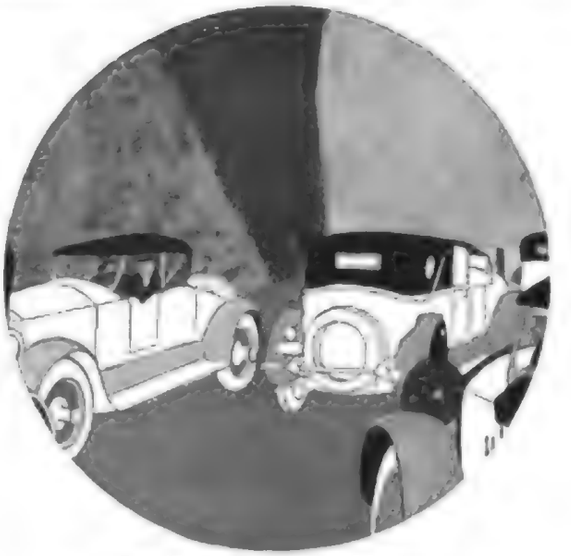
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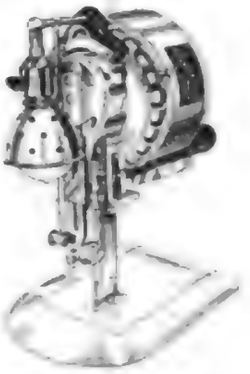
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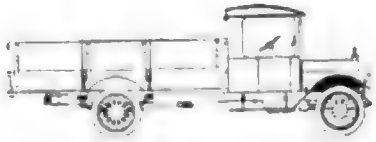
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The physical structure of each tiny hair spiral is an unlimited guarantee of the long-life resiliency which every automobile manufacturer wants built into the upholstery of his car while combining economy with luxury and adding materially to prestige.

No other material can quite compare with

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Made by an exclusive patented process which firmly weaves the sterilized curled hair onto burlap forming a perfect shock absorbing cushion which will not shift, mat down or get bunchy. This cushion is cut to size as ordered.

Send us blue prints of seats and backs, or state your requirements and we will submit prices and samples.

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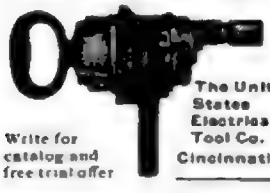
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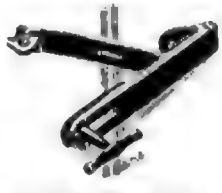
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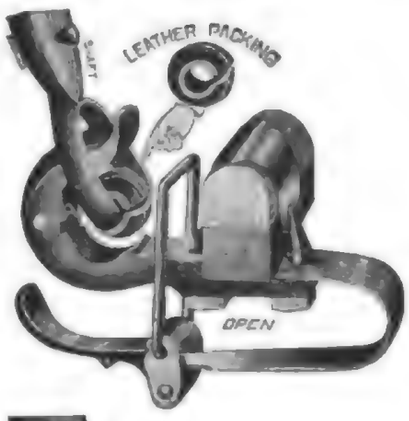
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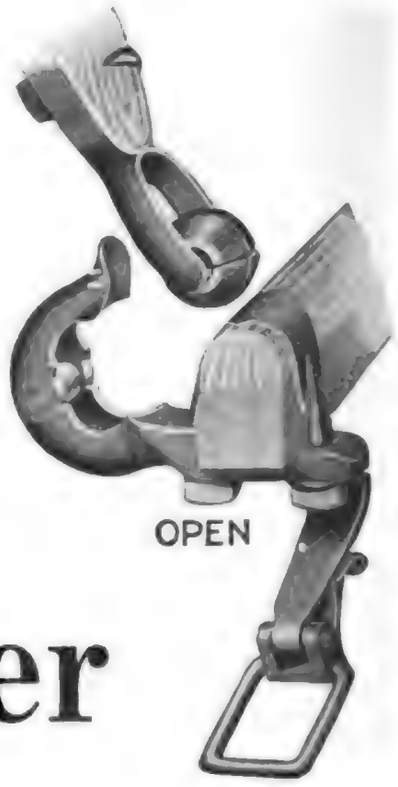
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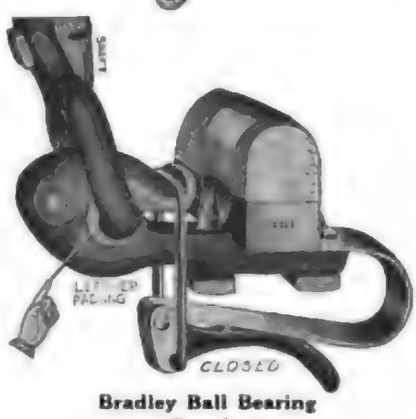


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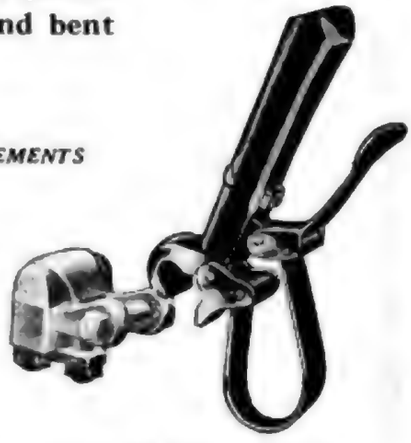
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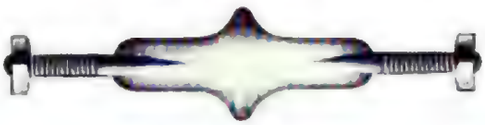
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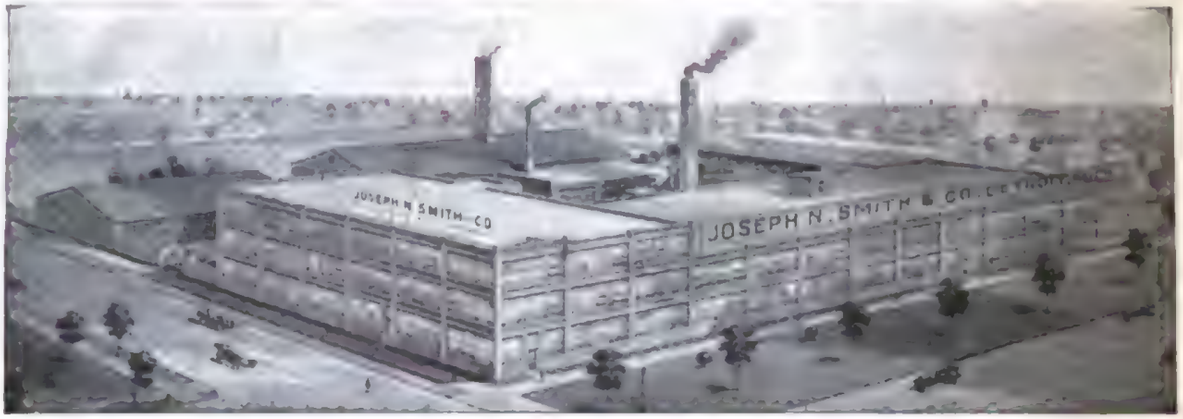
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VOL. 55—No. 4 JULY, 1919

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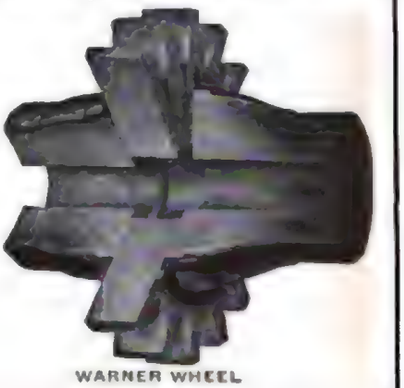
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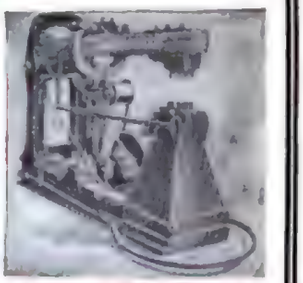
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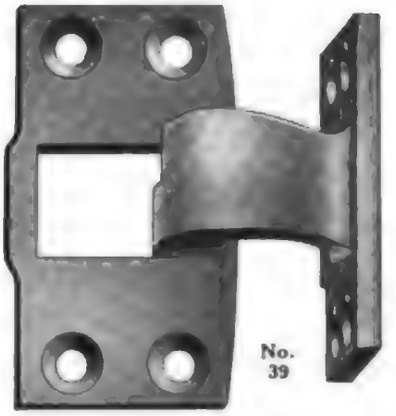


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PUBLISHED FOR 54 YEARS AS

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Published Monthly by
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Vol. 55, No. 4 **PHILADELPHIA, JULY, 1919** **Subscription Price $3.00 Per Year**

Public Pays the Freight

Unless the general Massachusetts public adds its indignant protest to the protests of the motor truck and trailer dealers and users of the Commonwealth against passage of House Bill No. 1748 reported by the Committee on Roads and Bridges, and the Bill is enacted through lack of interest on the part of the citizens, they will have cause later to complain more litterly against the high cost of living.

The man who is not concerned in the manufacture, sale or use of motor trucks may think he is not adversely affected by the imposition of excessive or prohibitive taxes on motor trucks and trailers. He may even fool himself with the belief that such taxes will reduce his own taxes by bringing larger returns to the State treasury from special interests. But he is greatly mistaken. Such special fees or taxes are only an indirect tax on the property owner and consumer. By this time acquaintance with the working of the Federal revenue tax acts make it plain that such taxes are passed on to the purchaser and consumer and therefore increase the already very burdensome high prices of everything used in the home.

Prohibitive Truck and Trailer Fees

On the ground of protecting the State highways, it is proposed to double the annual fee on a one-ton truck, nearly triple the fee for a three-ton truck, multiply it nearly six times on a five ton truck, and more than thirteen times on a seven-ton truck. The fees proposed range from $10 to $300.

Trailers, which have not been required to be registered and to pay fees heretofore, will, under House Bill 1748, have to pay the same fees as motor trucks when fitted with solid rubber tires and double these fees when running on metal tires. Thus, a five-ton trailer on rubber tires would be assessed $100 a year, nearly 7½ per cent. of its average cost price.

Why Consumers Pay the Fees

It is plain that the first effect of these ridiculously high truck and trailer fees will be to increase the cost of all haulage and delivery. But the operators can not assume this cost and continue to earn a living profit. Haulage contractors will have to charge more for their work and the manufacturers and merchants who pay these increased charges will have to raise the prices on the goods they make or handle to cover the increase. Those who use trucks and trailers in their own business must do the same. Usually, in passing on such indirect taxes, the consumer pays considerably more than the actual amount of the tax, because retail prices are not raised by fractions of a cent, and it is difficult to so arrange prices as to exactly meet the increased cost of doing business.

Why Trailer Fees Should Be Less

The proposal to tax trailers the same fees as motor trucks can be explained only as the result of ignorance on the part of the Massachusetts Committee on Roads and Bridges regarding the use of trailers. Under no condition does a trailer produce the same wear and tear of the roads as a motor truck of equal capacity. In the first place it weighs less because it has no engine or driving mechanism and can be built lighter. Whereas a five-ton truck weighs approximately 10,000 pounds, or as much as the load itself, a five-ton trailer weighs only 3,000 to 4,000 pounds.

No Tractive Effort on Trailer Wheels

In the second place, the trailer has no driving wheels and does not exert any tractive effort on the road. This tractive effort tends to loosen and tear up the surface of the highway and is as pronounced with a passenger automobile as with a truck; in fact, the high-powered, high-speed automobile does more damage to some types of road than the heavier, slow-moving motor truck with its broad, flat, solid tires. On the other hand, the wheels of trailers, which are merely drawn behind trucks, have only a rolling effect without any tendency to tear up the road surface. This is not only obvious, but is proved by the fact that rubber tires on trailers give two or three times the mileage of equal-sized tires on the truck drive wheels.

Use of trailers should be encouraged by the state highway authorities because they tend to decrease the size, weight and speed of road haulage units. Thus, the combined weight of the vehicles and load is less than when the same load is carried on two separate motor trucks and less tractive effort is delivered to the road surface. It is evident that none of these facts has been taken into consideration by the framers of the bill.

Roads for Use, Not to Be Admired

Unfortunately, the road authorities do not seem to realize that roads are not an end in themselves, but only the means to an end, and that end is cheaper transportation that will benefit all the residents of the State. If roads are to be of any use they must be built for economical haulage and must wear in proportion to the tonnage hauled over them. Naturally the cost of maintenance will increase as the volume of traffic increases. Roads are not built to be admired for their beauty, but to use, and, like anything else, will wear out with use.

Red Cross in Home Service

Five hundred open touring cars manned by drivers from the Metropolitan division of the Red Cross motor corps carried 1,000 wounded men of the 77th Division in the recent division parade in New York City. The convalescent fighters at the rear of the column directly behind the 302nd Infantry were transported in squads of four from Washington Square up Fifth Avenue to Seventy-second Street. They returned to special quar-

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ters in the city prepared for them by welfare organizations.

Each automobile was decorated with the divisional insignia and Red Cross banners, and equipped with thermos bottles and rations of sandwiches, cocoa, and chocolate, from which the wounded were served. Red Cross ambulances attached to the corps were stationed along the line of march, ready to care for emergency cases.

Now Is the Time—Let's Go!

Roger W. Babson, statistician and industrial expert, now Director-General of the Information and Education Service (U. S. Department of Labor), gives the following as being the stimulant needed just now to boost America from a period of uncertainty into a period of great prosperity. Mr. Babson says:

"The surest way to get the desired results is to tell the people what the trouble is and then to tell them how to remedy it.

"Briefly, our difficulties are due to the necessary readjustment of our war-time activities into peace-time industries. During the war the Government asked the people to refrain from buying anything they did not actually need. Every dollar, every ounce of strength, was needed for war purposes; there was nothing to spare for the production of things which could be done without.

"Now the war has ended, and we find that our stocks of peace-time goods are depleted. There is a lack of almost everything that was not produced in quantity for the war. With the depletion of our supplies there has come since the signing of the armistice nervous relaxation and a feeling of uncertainty and loss of confidence throughout the country.

"Labor and capital are muddled. Industry is marking time. The manufacturer has not been purchasing his raw materials except as he needs them from day to day. The merchant is operating with a skeleton stock upon his shelves. The public is refraining from purchasing except for its immediate necessities. Everyone is waiting for everyone else.

"How can business be energized? How can confidence be restored throughout the country? How can labor be induced to get back its desire to produce and capital to speed up the remobilization of peace-time activities?"

Mr. Babson believes that the desired results can be accomplished by administering the following stimulants to the country:

"First, tell all progressive manufacturers and merchants—tell all who have anything to sell—to advertise now and take advantage of the great market which exists at this time.

"Second, tell the public that now is the time to buy—that they, the people, in normal peace times are the controllers of all production and all distribution.

"If the consumer buys the merchant sells, and in turn is forced to buy. The manufacturer and the producer of raw materials are forced to buy and sell. Labor is put to work. The brakes put upon industry are thus removed. The machinery of production and distribution is set in motion.

"Now is the psychological time to begin this drive for prosperity. Let us take up the slack; let us do all that we can to allow the period of reconstruction to pass with the least possible hardships for labor and capital."

The Body Builders' War Tax

Due to the many misunderstandings of the law relating to the war tax on motor bodies, the Carriage, Wagon and Motor Body Builders' Association of Philadelphia appointed a special committee to examine into the question, and with the assistance of legal talent and government agents arrive at a definite and clearly worded statement of the body builder's position.

This committee has made a report which has been printed and circulated, not only to actual members of the Philadelphia organization, but to all others in the local trade who are believed to be interested. The report is reprinted here so that its usefulness may be not confined to the Philadelphia local builders.

Body Builders' War Tax Rulings

1. Where a body builder builds and mounts a new body upon a new chassis for a customer, who is not a manufacturer of automobiles or automobile chassis, the body builder is to charge such customer a tax of five per cent. upon the complete body.

2. Where a body builder builds and mounts a new body to replace an old one for a customer, who is not a manufacturer of automobiles or automobile chassis, he is to collect the same tax as though this body was put upon a new chassis.

3. Where a body builder builds and sells a new body to a customer, who is not a manufacturer of automobiles or automobile chassis, and it is not mounted upon any chassis, the body builder is to collect the same tax as though he had mounted it upon a chassis.

4. Where a body builder builds and mounts a new body upon a new or second-hand chassis belonging to a manufacturer of automobiles or automobile chassis, to be sold by said manufacturer as a complete automobile, the manufacturer is liable for the tax, and not the body builder.

In regards to repairs made upon automobiles, that may be made necessary either by the parts wearing out, or broken because of accident, we recommend the following action:

Under regulation 47, article 15, this is clearly defined.

On any part or accessory to an automobile, that may be made by a manufacturer and sold as a particular part for said automobile (we having to purchase this part from said manufacturer or dealer) we pay the tax to said manufacturer or dealer, and he reports this tax to the Government.

As it is not the idea of the Government to collect a tax twice on the same article, we would not have to report this to the Government, as we paid this tax. This would refer to any part so purchased.

If, on the other hand, we make repairs to an automobile and take the material, from which these repairs are made, out of our common stock (such as lumber, iron, steel, bolts, screws, canvas, leather, or other trimming material, paints or varnishes) and so fit and fashion this material as to accomplish the repair needed, there would be no tax upon this work.

Therefore, all carriage and wagon builders who do not carry any specialized automobile parts or accessories would not have to collect any war tax whatever upon any repair work that they might do.

Body makers, carriage, and wagon builders who have built bodies for either new or second-hand chassis, and sold them to a customer, who is not a manufacturer of automobiles or automobile chassis, should make returns to the Government for such bodies delivered since February 25, 1919, along with check to cover a tax of five per cent on such sales. These returns should be sent on regular forms furnished by the Government. March returns should include that part of February after the 25th; April returns cover April, May returns cover May, etc., etc.

A New Phase of Industrial Education

An intimate glimpse of a new phase of industrial education possessing far-reaching possibilities for American industry, is contained in an illustrated bulletin recently issued by the U. S. Training Service of the Department of Labor under the title, "Efficient Training in a Large Plant." The system of imparting trade knowledge and skill to industrial workers set forth in these pages, is in operation in an eastern plant employing at times as many as 10,000 persons. This department has trained beginners so that they learn the right way of performing their task in about half the time ordinarily required for "breaking in." Today more than 350 plants have training departments similar in principle to this one.

To any person alive to the social problems so acute in these days, this form of practical education will be a source of much interest. The booklet recites the steps taken in training employees in this plant. The first is the giving of a lecture interpreting the spirit of the plant to the workers, explaining the purposes of the training courses, giving knowledge of safety regulations, etc. Following the address the employees are divided into groups of five or six each under an instructor, and assigned to the 80 machines, which constitute the equipment of the training department. The instructors are provided with

mimeographed sheets which indicate in detail the steps to be taken in teaching the operation of the different machines. To train the workers requires a few days or weeks, according to the work being taught.

Of equal importance with the training of beginners is the upgrading of old employees, that their work may be raised to standard, or that they may be fitted for promotion. This booklet is one of a series dealing with various phases of industrial training which will be sent free to any address. Requests should be sent to the U. S. Training Service of the Department of Labor, Washington.

Increasing the Usefulness of the Patent Office

The Patent Office Society is calling attention to the fact that the Patent Office has been unable to obtain adequate appropriations from Congress for its most urgent necessities; that inventors have paid in fees a sum sufficient to have the work of examination done promptly and done thoroughly; and that while everybody agrees that this money should be used for that purpose, nevertheless it has not been so used, to the great distress of the inventors of the country.

Hon. Thomas Ewing, Commissioner of Patents during President Wilson's first term, describes the situation as follows: "The Patent Office through the ordinary channels is not able to influence Congress to give it proper facilities. Only influence from the outside, * * * influence that is entirely proper and legitimate, of people who are interested in having the thing done right, can bring effective pressure to bear upon Congress."

A Movement to Remedy Bad Conditions

An earnest movement is now on foot to remedy conditions. The Patent Committee of the National Research Council has proposed certain legislation that will increase the efficiency of the Patent Office in the handling of all matters pertaining to inventions and patents, facilitating quick and more thorough research, prompt determination of the rights of inventors, and avoidance of unnecessary litigation in the courts. The Patent Committee is composed of some of the leading inventors, scientists, engineers, and patent attorneys of the country, and its recommendations are entitled to full acceptance and general support.

The Constructive Program

The Patent Committee proposes a program of but four features believed to be of fundamental importance: (1) The establishment of a single court of Patent Appeals to take over the appellate jurisdiction now lodged in the nine independent Circuit Courts of Appeal: (2) The establishment of the Patent Office as a separate institution independent of the Department of the Interior; (3) An increase in the personnel of the Patent Office to enable it to render prompt and efficient service and an increase in the salaries to approximate those paid in outside patent work so that qualified examiners may be kept in the public service; (4) A change in the law relating to damages in infringement suits to answer one of the most common and strongest reproaches against the patent system, namely, that a patent does not ordinarily pay the inventor any money.

The examining force, the clerical force, the working space, office equipment, the library and other facilities are alleged to be totally inadequate for prompt and thorough work, although an unused fund of fees amounting to nearly eight and one-quarter millions has been allowed to pile up in the Treasury.

It is asserted that the failure of Congress to provide facilities for granting patents that really protect is due to the fact that the situation has not been particularly brought to its attention. Mechanics, inventors, manufacturers and others are urged to request their representatives in both branches of Congress to support the meritorious bills of the Patent Committee of the National Research Council.

Against Blue-Sky Finance

All over the United States advertising men, organized in local groups, maintain a volunteer censorship on advertising printed in newspapers, periodicals, and other forms. When manifestly dishonest statements are published by disreputable business concerns, steps are taken to protect the public. Through the activity of the advertising fraternity dishonest publicity has been made a statute offense in many States.

Writing in Printers' Ink, Mr. Percy H. Whiting, advertising manager of the Central Maine Power Co., Augusta, Me., points out the present opportunity for protecting the public against "sky finance"—the sale to small investors in Liberty bonds and War Savings Stamps of worthless securities. He suggests that advertising men everywhere take a definite stand against blue-sky promotions, and invite their local publishers to choose between legitimate advertising and the piratical kind.

Government Investments Aid Thrift Habit

Mr. Whiting sees something more than the protection to the public today. Looking ahead to tomorrow, he anticipates new facilities for financing local enterprises through the sale of small bonds of public-service corporations, industrial concerns, and communities to people who have learned to invest by purchasing Liberty bonds and War Savings stamps. His own corporation recently offered preferred stock to small investors locally, and the worst obstacle encountered in advertising and selling this stock was the competition of sky-finance promoters, and the inability of thrifty people to distinguish between sound and unsound securities.

As the Nation becomes more skillful in investing, as a result of its war-thrift habits, carried over into permanent peace habits, there should be capital available for local manufacturing, transportation, electric light and power, gas, water, schools, roads, and other needs. But only conscientious protection of the public by experienced business men can build the foundation, which is one of public confidence.

Training Departments Help Production

The practical value of industrial education in manufacturing plants finds abundant evidence in a bulletin entitled "How Training Departments Have Bettered Production" which has just been issued by the U. S. Training Service. This publication contains a symposium of experiences in seventeen American factory training departments, together with valuable suggestions as to how to carry on instruction. A variety of industries is represented among the concerns listed. In each case an attempt has been made to indicate just the manner in which training has been applied, the approximate length of training, the benefit derived, the cost, etc.

The pamphlet shows that each concern employed practical production men, possessing ability as instructors, to study the various operations performed in the plant and determine just how each one should be taught. In most cases a separate room was set aside for the training department in which representative machines were installed. On these machines selected workers are trained.

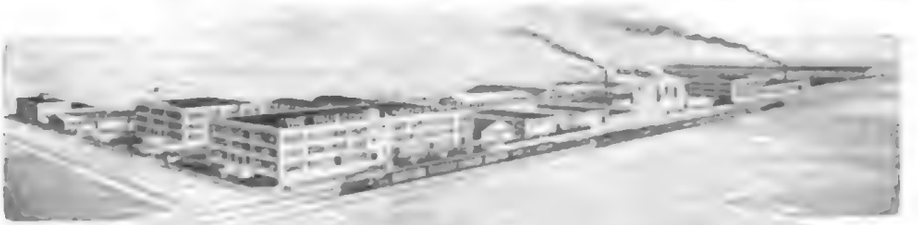
Reports show that on the average the learning time is approximately one-half that ordinarily required for "breaking in" an employee by the old haphazard method. In some cases the training work here discussed was instituted during the war where the emergency required that special attention be given to training new employes. In other plants, however, training was adapted to more normal times and was maintained to upgrade old employes, as well as to "break in" new employes.

The Training Service considers that under normal conditions helping old employes is the chief task for a training department. The concluding pages of the pamphlet are devoted to a plan for organizing a training department and indicate in detail what should be taught and how to teach it. This bulletin is one of a series which has been published by the U. S. Training Service for free distribution. All requests should be addressed, U. S. Training Service, care of Department of Labor, Washington, D. C.

Increase in Manufactured Exports

In the six months since the war for which figures are now available, finished manufactures have been going out of the country at the rate of $6,300,000 per day, while in the year before the war they went out at the rate of about $2,000,000 per day, according to a report from the National City Bank. In the other group of manufactures classed as "manufactures for further use in manufacturing" there has also been an increase but not as great as in the class "manufactures ready for consumption." Of the group "manufactures for further use in manufacturing," the exports since the war have averaged about $2,500,000 per day, while in the year preceding the war they averaged about $1,000,000 per day.

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

VI.—ENGINE WORK

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

Engine work may be divided into two classes—miscellaneous adjustments and overhaul. In the first class comes carbon removal, valve grinding, ignitions and carburations adjustments and all work that can be done without removing the engine from the car. In the second class comes scraping and tightening bearings; fitting wristpins; lapping pistons, fitting rings, etc.—in short—complete overhaul.

Work coming in the second class can best be accomplished when the engine is removed from the car and placed on a special stand that renders all parts accessible. Motor car manufacturers have so designed their product that the engine can be readily removed, and the increased accessibility of parts renders this removal advisable.

The Engine Stand

In Fig. 2 is shown a simple engine stand that the mechanic can make, and there are many most excellent stands on the market. The stand illustrated is angle iron framework, and may be set so that any engine can be accommodated. In it, the engine may be turned and locked in any position.

Locating Engine Troubles

The experienced motor mechanic has little difficulty in locating engine troubles; but the chart shown in Fig. 1 will be of aid to the less experienced men. Misfiring or "skipping" is a frequent trouble, and one of which it is often difficult to locate the cause. The following procedure is recommended:

1. Test the ignition with a screw driver, to see that each plug is getting a "fat" spark.

2. If so, examine and clean the plugs, adjusting them so that the points are ½ inch (the thickness of a dime) apart. This is necessary.

3. If not, examine the secondary wiring; the primary wiring and magneto or battery breaker, and go through the ignition system step by step.

4. See if engine is getting gas and if so, determine the effect of mixture changes.

The secret of engine adjustments is to study the effect of one adjustment at a time on the operation of the engine, and if not beneficial, replace it in its original setting, with consideration of the chart (a) Fig. 1.

Lapping Pistons

When a cylinder is badly scored or bell-mouthed, it should be rebored and new oversize pistons fitted. This may best be done by means of a special reboring tool or cylinder grinder, of which there are several on the market. But when the cylinder is slightly worn, new pistons may be lapped in, and new rings fitted. Patent compression tight rings are often used advantageously here, to prevent compression losses, overoiling and piston slap.

In Fig. 3, is shown a special handle used for lapping in new pistons. The piston to be lapped is secured to the handle by a wooden wristpin—(wood will not score the cylinder walls). A thin mixture of fine valve grinding compound is applied to the piston and the piston lapped into the cylinder it is to occupy. The motion of lapping is a combined up-and-down and turning motion. A cast iron piston should be about .004—.006 in. smaller than the cylinder it is to occupy. Alloy pistons should *never* be lapped in, as being soft, they hold compound and later score the cylinder.

Removing Carbon

The simplest method of removing carbon from an engine is by the oxygen process. However, certain points are to be noted. First, the gasoline should be turned off and the carbureter drained, and the engine allowed to run as long as it will. With the spark plugs and valve caps removed crank the engine until No. 1 cylinder is on dead center with both valves closed. Cover all wires and connections above the engine with a damp cloth to prevent injury by heat and have a fire extinguisher handy. Then turn on the oxygen with about twenty pounds pressure, drop a lighted match into No. 1 cylinder and insert the torch. The carbon

FIG. 1. ENGINE TROUBLE CHART

Trouble	Reason
(a) SKIPPING	
1. Engine starts hard, skipping and backfiring at first	Too little gasoline. See if carbureter is getting fuel. If so adjust carbureter
2. Engine misfires at start and has low compression.	Compression leak due to poor valves, poor fitting pistons, scored cylinders, or use of poor oil
3. Skipping due to none of above at low speed, spark to plugs O. K.	Spark plugs defective. Points poorly set, or carbonized
4. Starts readily but chokes up, exhausts black smoke and stops	Vacuum tank suction to intake manifold leaking.
5. Hard starting combined with skipping at high speed.	Breaker post is out of adjustment, or pitted; possibly caused by faulty condenser, or sticking breaker.
(b) KNOCKS AND POUNDS	
1. A heavy pound under loads	Loose main crank bearing or end play in crankshaft
2. A sharp slapping when engine is speeded up.	Undersize pistons or loose wrist pins
3. A sharp knock noticeable on speeding up with spark retarding	Carbon in cylinders or too early ignition setting
4. A knock at half engine speed	Camshaft knock
5. Heavy pound with all bearings tight.	Loose flywheel or engine hold-down bolts.

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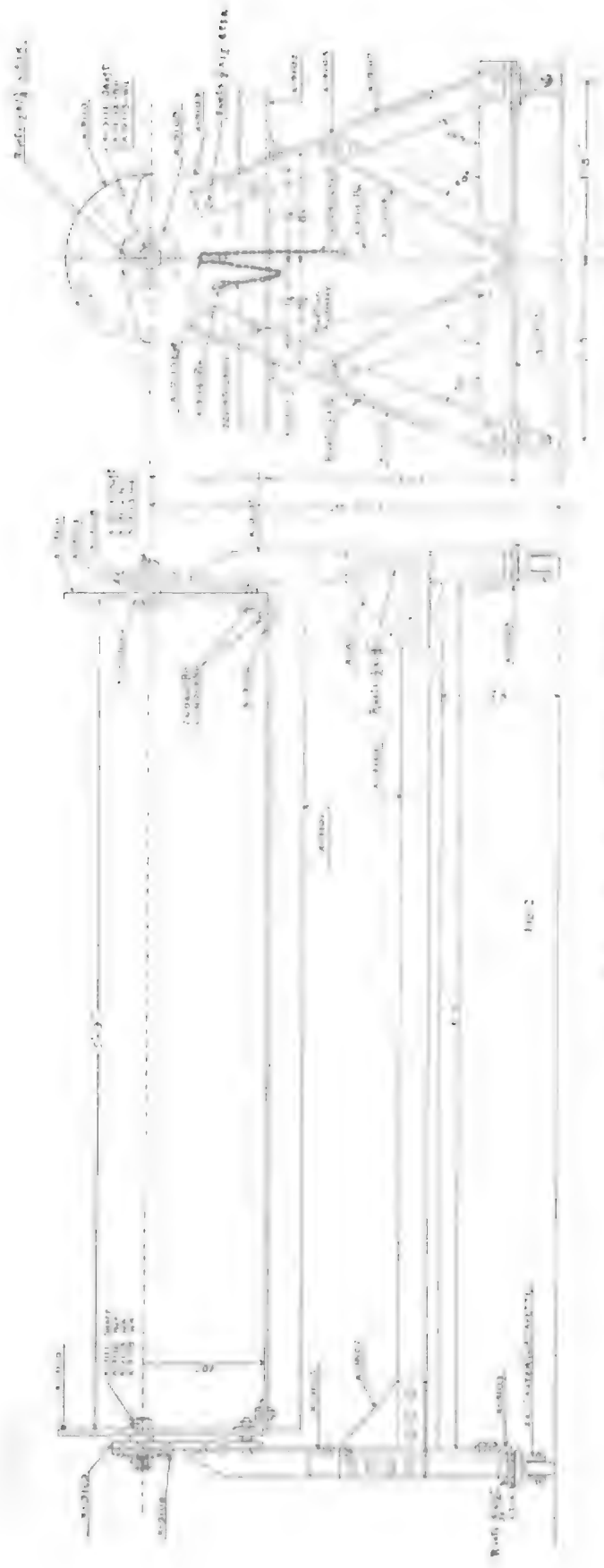


Fig. 2. A Simple Engine Stand that a Mechanic Can Make.

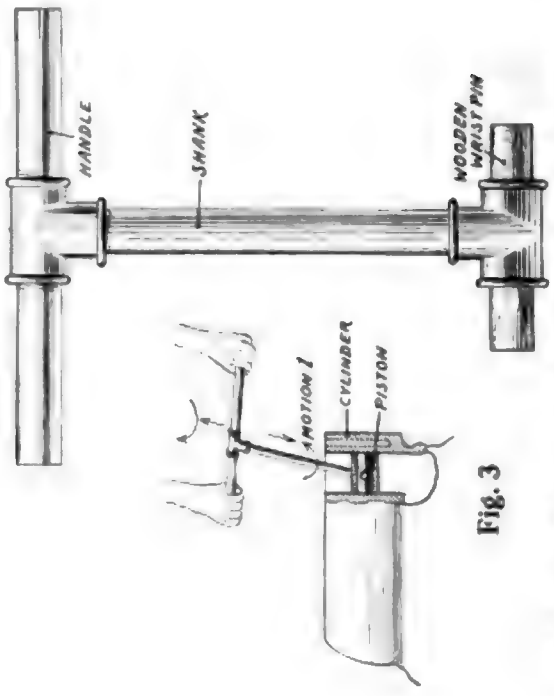


Fig. 3

Fig. 3. New pistons are lapped into old cylinders by the aid of the above tool. Ground glass and oil are used, and the motion is as shown.

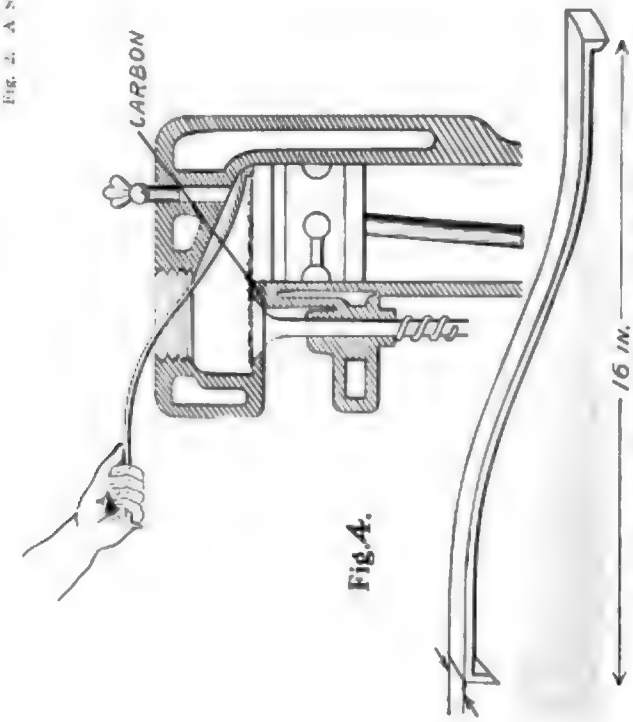


Fig. 4.

Fig. 4. Removing Carbon by Means of a Special Scraper.

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will catch fire and should be followed by the gas. When no further carbon will burn use the scraping tool shown in Fig. 4, and go all over the piston and cylinder heads, loosening the remaining portions. Another burning should complete the job for that cylinder, though some mechanics wet the inside of the cylinder with cylinder oil, that the flame may carry away from one point of carbon to another, and clean up. The remaining cylinders should be treated in a similar manner.

Valve Grinding

Valve grinding is sufficiently common to be well understood by most mechanics. In this work several items of special equipment are valuable. One is the reciprocating type grinder that gives the correct grinding motion by turning a crank. Another is the valve seat reamer and valve refacer. When valves are badly pitted it is a tedious job to grind them in. If a refacer is not at hand, a lathe, set up as shown in Fig. 5, may be used. The lathe so used, however, should be turned by hand; not power. The valves should be ground in till they seat all the way around and will hold gasoline under their own weight. All parts should be carefully washed to remove the grinding compound before replacement.

Scraping Bearings

Volumes could be written about the art of scraping bearings and could be summed up in two words—*care* and *accuracy*. The process is simple. The bearing cap is removed, and if all surfaces are not scored, a shim is removed and a small amount of metal is filed off the mating surfaces. Prussian blue is spread over the surface of the shaft, and the parts replaced and the shaft turned. On removal, the high points on the bearing will be blue and are scraped down. This process is continued until the greater part of the bearing touches the shaft—the sides being relieved, or cut away somewhat. Care must be taken to so scrape that the bearing is not twisted with reference to the shaft, and usually a square is used to check this alignment. A "scraped-in" bearing, with little oil, is very stiff—for example, a connecting rod bearing should be tight enough to just support the rod and piston assembly.

A New Substitute for Tool Steel

One of the war-time developments in England due to the acute shortage of tungsten was the manufacture of an alloy steel containing no tungsten to take the place of tungsten high-speed tool steel. This steel, high in chrome and cobalt, is now being used for the manufacture of dies and tools, being offered as a substitute both for carbon and tungsten high-speed tool steel. The steel is made in Sheffield, England, and received here in pig form. The pig metal is melted at a Cleveland plant in a crucible and cast in molds in the form desired. The pattern makers make the same allowances for shrinkage as they do for soft steel. The case tools are furnished in an annealed form to the customer, who machines them to accurate dimensions, and after hardening they are ready for use.

The alloy is being cast into blanking, drawing and forming dies, hot and cold trimmers to forge work, milling cutters, counter sinks, slotting saws and bending rolls. It is also stated that cast tools made from this alloy are being successfully used as cutting tools on lathes, planers and shapers when working on brass and bronze. The metal produces, it is claimed, a clean casting free from blow holes and other imperfections.—*Scientific American.*

Bronze and Its Uses

Bronze is essentially a bearing material, and as such the parts are made so that they may be removed when worn to excess and a duplicate new piece put in. As the cost is several times that of any material so far considered, the parts are made as thin as reasonable life and proper resistance to stresses will permit. No hard and fast statements as to color, strength and working can be made that cover all bronzes, for they vary from a lemon color to almost a copper hue, they are compounded to give—singly or together—strength, long life, or antifriction properties, and some bronzes work like soft brass, though most are brittle and hard, the chips shooting away from the cutting tool like miniature bullets. Bronze as a bearing metal is designed to take the wear off a more expensive part or one harder to replace though wearing a long time itself and during its life to prevent scoring and keep the temperature of the moving parts down as low as possible.

Besides its use for bearings, bronze castings are made and so also are bronze forgings. Front axles of bronze formerly were used extensively. Steering wheels and gearshift and brake levers are made of bronze. These parts stand bends to a remarkable degree. To straighten back, the smaller bends are taken out cold, the worse bends by bringing to a low heat, straightening and allowing to cool without the application of water.—*Motor Age.*

Trailers and the Vehicle Trade

Why Carriage, Wagon and Body Builders Should be Interested in the Latest Development in Highway Transportation.

By Harry Wilkin Perry.

As a comparatively new but rapidly increasing agency in transportation by highway, the trailer should be of peculiar interest to the carriage and wagon trade. First, from the manufacturing standpoint it is analogous to the vehicle business, and most of the large trailer companies are old wagon and carriage builders, as, for example, the Troy Wagon Works Co., Watson Wagon Co., the Trailmobile Co. (formerly Sechler & Co.), Freuhauf Trailer Co., Wm G. Hesse & Son Mfg. Co., and others. Second, trailers are commonly sold without bodies, which affords a large and growing business for the body builders. Third, dealers in wagons, through their connections with team and wagon owners, have special qualifications to become successful agents for the sale of trailers.



Warner Heavy Duty Trailer, 2½ ton capacity, hauling a load of rags

Use of Trailers Should Extend Rapidly

There are fifty or more trailer manufacturers in the country who are engaged in the production and sale of trailers on a commercial scale. Some are doing a large business, and the sale of trailers is increasing at the rate of from 50 to 100 per cent. a year in different States. There is no information as to the total number of trailers in use in the country, but at the end of last year there were 948 in Pennsylvania, while on February 1, last, there were 2,218 registered in New York State. Based on these two States, it may be estimated there are upward of 50,000 trailers in the country. This is a very small number as compared with the 600,000 motor trucks in service, but the trailer is a comparatively new development and, as the majority of truck owners and a great many farmers and others who own motor cars, could operate trailers with advantage and economy, there is every reason to expect a more rapid increase in the sale and use of trailers than has occurred with these two types of vehicles.

In the first place, the automobile and truck industry has blazed the way for the trailer by educating the public to the ad-

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vantages of the motor vehicle. It will be relatively easy for the trailer manufacturer and dealer to convince the truck or car owner of the advantages and economy of the trailer. Thus, the trailer sales organization has a list of 6,000,000 owners of motor vehicles who have been "sold" on motorized transportation.

In the second place, trailers are relatively inexpensive, costing approximately one-quarter as much as motor trucks of equal load capacity, so there is not much resistance to sales on the score of heavy investment.

Third, the adaptability of the trailer to the solution of many special haulage problems in various lines of business, its inexpensive operation and the tremendous savings it effects



King Semi-Trailer, with Side Dump Steel Body

in hauling expense are so obvious and make such a strong appeal, that they are the strongest kind of sales arguments.

Sturdy Contruction Follows Truck Design

As made today by leading manufacturers, trailers are by no means a mere make-shift. It was learned long ago that horse-drawn wagons and light trailers built on wagon lines, could not be used with motor trucks successfully and economically. Shocks and stresses are multiplied so greatly when speed is increased from three to four miles an hour to twelve or fifteen miles, with load, that wagon axles, wheels, springs and iron tires will not stand up to the test. Hence, the most successful trailers are of very sturdy construction and generally follow designs worked out through years of motor truck practice. Rolled or pressed steel frames, truck axles, truck springs, heavy artillery type wheels, and rubber tires are used.

Adapted for Use With Passenger Cars and Trucks

Steel or iron draw-bars with special coupling devices to connect with the rear end of the truck or automobile are provided and are so connected with the steering gear of the trailer that the front wheels of the trailer track with the rear wheels of the towing vehicle, thus avoiding the cutting short of corners on short turns. Semi-trailers having but two wheels are designed to be used with a "fifth wheel" mounted on the rear end of the motor truck chassis. This supports the front end of the trailer and acts as a combination of king-bolt and hinge, permitting the truck to turn under the front end of the semi-trailer and allowing the rear axle of the truck to rise and fall with relation to the front axle of the truck and the trailer axle. The trailer draw-bars and the semi-trailer fifth wheels are provided with springs to absorb the shocks of starting and stopping and the minor ones due to inequalities on the road surface.

Trailers are built in all capacities, for loads of a few hundred pounds up to ten tons or more, and for all sorts of purposes. One manufacturer alone has supplied trailers for nearly 200 different lines of business and for use with 80 different makes of trucks. The lighter, high-speed trailers for use with automobile runabouts, touring cars and light trucks are made with ball bearings and equipped with pneumatic tires, while the heavy-duty trailers for use with motor trucks generally have roller bearings or sometimes floating bronze bushings and are fitted with solid rubber truck tires.

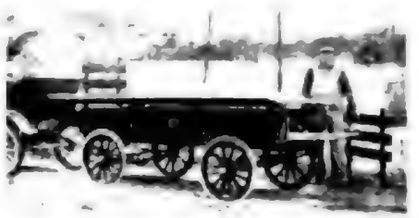
Wide Variety of Body Types

Because of the great diversity of uses to which trailers are put, there is the widest possible variety in types of bodies used with them. The body problem, in fact, is very similar to that of the truck body except that it is simpler, since there is no seat or cab to be considered; the frame of the trailer is a clear, straight parallelogram. There is considerable demand from farmers for trailers fitted with farm wagon type bodies of 1,000 to 3,000 pounds capacity. Express type bodies are also in large demand, while stake and slat bodies are widely used for general haulage and rural motor express work, in capacities of two to five tons. For road contractors' work, coal delivery, etc., end, side and bottom dump bodies are used on trailers. These may be either of wood or steel. In the lumber trade it is rather common practice to employ bodies provided with iron rollers so that the load may be rolled off at the rear in a few minutes instead of piece by piece.

There is ample opportunity with trailers, as with trucks, for the making of special bodies to meet peculiar requirements and also for fancy bodies with an advertising motive. Some of these will be shown from time to time in subsequent issues.

Most Economical Method of Hauling

Among those who have investigated the subject, it is conceded that the combination of motor truck and trailer is the next forward step in efficient highway transportation. The reason for this is that, under favorable conditions of road and service, a motor truck of a given capacity can haul one or more trailers of equal load capacity with compar-



Arcadia One-Ton Express Body Farm Trailer

atively little increase in operating expense. Thus, a five-ton truck can haul its own load plus five tons more on a trailer at an additional expense of from 10 to 20 per cent, according to conditions, whereas the expense would be doubled if another truck were put on to do the work of the trailer. One of the principal savings effected by the trailer is that of an additional driver, at a wage of $4 to $5 a day; others are interest on investment, repairs and overhaul, insurance, gasoline and oil, and tires.

It will be evident that less fuel and oil are required to move a ton on a trailer than on the truck itself since the trailer weighs only one-quarter to one-third as much as the truck, which carries the engine and transmission mechanism and must also be built correspondingly heavier. Thus a five-ton truck weighs approximately as much as the load it is designed to carry; that is, 10,000 pounds, while a trailer of equal capacity weighs only 2,500 to 3,000 pounds. In practice, the gasoline consumption of the truck hauling a trailer is found to be increased from 10 to 20 per cent.

Except where road conditions and gradients are such that all or nearly all of the power of the truck engine is required to move itself and its own load, when running in low speed, there is likely to be enough reserve power or draw-bar pull to haul a trailer. On hard-surfaced, level roads, almost every truck has sufficient power to haul two or even three trailers. Thus, the cost per ton-mile for haulage can be cut in half in many cases.

Keep Trucks Moving Maximum Time

But it is not only through doubling of the loads hauled that the trailer decreases operating expense. There are many lines of business that necessitate long waits for load-

(Continued on page 19)



Troy Trailer, hauling a load of six and one-half tons behind a Pierce-Arrow truck loaded with six tons.

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Rowe
THE PIONEER WORM-DRIVE TRUCK



This Man Assures Dealers a Square Deal

He delights in giving every assistance possible to the men who handle Rowe Trucks

AS originator of the trucks that bear his name and as active head of the company manufacturing them, he is in a position to know exactly what he is giving you in every Rowe model.

He knows, first of all, that it has been designed right, each truck being specially drafted for the special work it has to perform. He knows that the assembling of the various standard parts has been properly done and also that every Rowe Runs Right, for it is carefully road-tested before being shipped.

There are five Rowe models, covering every business requirement, thus Rowe dealers have an unlimited selling scope.

If you are not a member of the family of Rowe agents, Mr. Rowe offers you a place in it right now.

Ask him for details of his liberal proposition to dealers

ROWE MOTOR COMPANY
LANCASTER, PA.

ROWE RUNS RIGHT ROWE RUNS RIGHT

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Rowe Rowe

Rowe 2-Ton Model

C. D. W.



A Truck that is serving in many capacities, doing remarkable duty under most stressing conditions.

It Is a Splendid Seller

Specifications same as on opposite page, with following exceptions:—Wheel Base, 140 inches; Tread, 60½ inches; Length of Frame back of seat, 10 feet, 3 inches; Overall length, 16 feet, 11 inches.

ALL ROWE TRUCKS ARE FULLY GUARANTEED IN EVERY PART

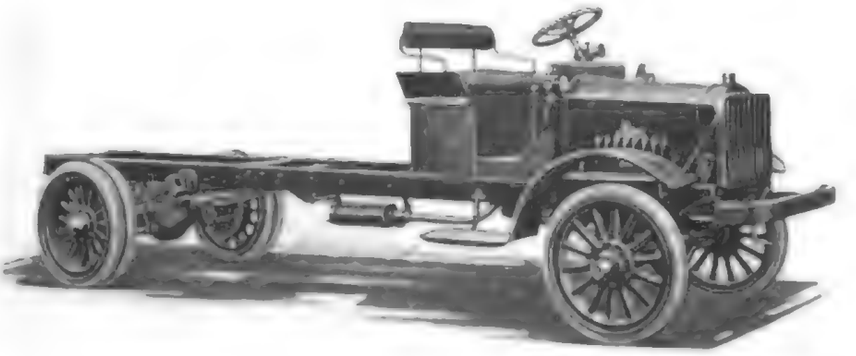
ROWE MOTOR COMPANY

LANCASTER, PA.

ROWE RUNS RIGHT ROWE RUNS RIGHT

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Rowe 2½-Ton Model
C. D. W.



SPECIFICATIONS

MOTOR: 32 horsepower, 4-inch bore by 5-inch stroke, 4-cylinder, cast en bloc, cooled head. Three bearing crank shaft of liberal proportion made of heat-treated chrome-nickel steel.

TRANSMISSION: Selective sliding gear type, four speeds forward and one reverse. Gears special triple heat treated.

CLUTCH: Multiple disc type of special design. Rubeatos and steel.

LUBRICATION: By gear pump driven by the cam shaft and accessibly located on the side of the motor. All moving parts are constantly covered with a spray of oil.

IGNITION: Bosch high tension magneto.

CARBURETOR: Zenith.

COOLING: By the tested and proven pump system, with unusually large radiator capacity. Cellular radiator, heavy spring suspension protected by special radiator collision guard of type now used on U. S. Army trucks.

GASOLINE SUPPLY: By gravity feed from large tank under driver's seat.

CONTROL: The car is driven from the left side, with control levers mounted in the center, directly on transmission case. Gear-shift lever has positive locks for each of the four gear positions. Spark and throttle lever mounted directly on the steering wheel.

WHEEL BASE: Standard, 162 inches. Tread, 62 inches.

REAR AXLE: Worm gear, housing type with David Brown worm gear. Worm special steel, heat treated, with hardened steel differential gears. Roller and ball bearings are used throughout.

SPRINGS: Of alloy steel; rear, 3 x 50 inches, semi-elliptic type, so slung as to minimize all road shocks. Front spring 2½ x 41 inches.

STEERING GEAR: Irreversible, of the worm and nut type, operated by a 20-inch wheel.

FRAME: An original design in high carbon steel of a type found most suitable for trucks. 6 x 2 inch Channel steel section. Width, 33 inches. Length back of seat, 12 feet 3 inches.

TIRES: 34 x 4 inch front; 36 x 4 inch dual rear. Solid rubber.

OVERALL: Length 18 feet 8 inches.

WHEELS: Second growth hickory of the artillery type.

FENDERS: An attractive design in angle steel. They are joined to the running boards in the front.

SPEED: Maximum speed with governor—15 miles per hour.

LAMPS: Two dash oil lamps and one tail lamp.

EQUIPMENT: Vibrating horn, kit of tools, jack, bonnet wrench and hub wrench.

ROWE MOTOR COMPANY
LANCASTER, PA.

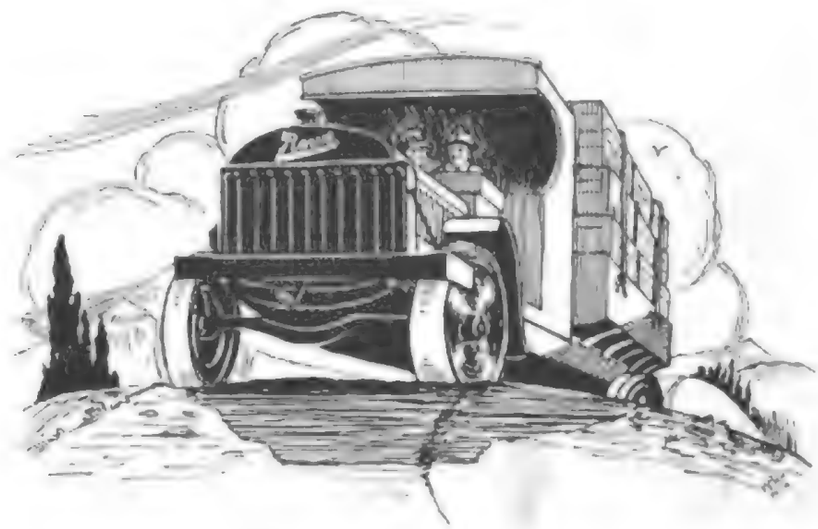
ROWE RUNS RIGHT

ROWE RUNS RIGHT

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Rowe
THE PIONEER WORM-DRIVE TRUCK

As Hill Climbers
Rowe Trucks Are Remarkable



IN such hilly cities as Pittsburgh and Cincinnati, they are giving uninterrupted service, and, because of this dependability, dealers find it easy to secure business. There is a Rowe truck for every kind of work and *Every Rowe Runs Right.*

Each model has plenty of power and plenty of strength to enable it to stand up to the service for which it is intended year in and year out.

Some of the first Rowe trucks built are still in active service with a record of nearly 200,000 miles to their credit.

The Rowe reputation is a reliable sales asset.

Write about a Rowe agency now—the time is ripe, and there's an opportunity to secure mighty good territory.

ROWE MOTOR COMPANY
LANCASTER, PA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

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Trailers and the Vehicle Trade

(Continued from page 14)

ing and unloading, as in the lumber trade. The semi-trailer is peculiarly suited to this field, because one or several semi-trailers can be left in the yard for loads to be made up while the tractor truck is on the road hauling one of the loads. Upon reaching destination, the load can be rolled off the rear end of the trailer in a very few minutes—with some constructions, in less than one minute. This system keeps the truck in constant operation and doubles, triples, or may quadruple the tonnage delivered in a day.

With modifications, this system is applied with remarkable success to numerous other lines of work, such as the wholesale grocery, dairy, retail coal, brick, etc.

Trailers Solve Special Haulage Problems

Again there are many materials that are too long, too bulky or too heavy to be hauled on the motor truck itself. Telephone and telegraph poles, timbers, logs, structural steel, iron pipe, derricks, steam boilers, water tanks, stone columns, etc., are examples of the long, heavy materials. These are loaded on trucks and semi-trailers or trailers so that the forward end of the load is carried on the truck and the rear end on the trailer, thus dividing the weight and at the same time making short turns possible. In the case of light, bulky articles like barrels and boxes, woodenware, willow furniture, etc., the truck has much more than sufficient power to handle any load than can be put upon a body of practicable size. Consequently one or more trailers can be used with utmost advantage and corresponding reduction of haulage cost.

Automobile body companies in Detroit are able to haul a dozen bodies set crosswise and double-decked on a light trailer where not to exceed four could be carried on the trucks that haul the trailers. The same system could be applied to the carriage and body trade.

Trailer Makers Organized to Co-operate

It must be apparent from the foregoing that some study of the trailer and its applications on the part of the vehicle industry in general will be well worth while.

Leading trailer manufacturers have shown evidence of their intention to promote their interests through a co-operative movement by organizing the Trailer Manufacturers' Association of America and establishing headquarters at 110 West 40th Street, New York. The purpose is to furnish information on all phases of trailer manufacture, sale and use. The association was organized last March and now has seventeen members, located in Massachusetts, New York, Pennsylvania, Ohio, Michigan, Wisconsin, Kansas, Texas and California.

Bruce E. Anderson, formerly with the Ideal Engine Co., has become general manager of the Lansing Body Co., Lansing, Mich., succeeding Frank Thoman, who retires as manager but continues as a member of the board of directors.

Automobile Steel Sheets

By F. W. Beach, General Manager of Sales, of the Mansfield Sheet and Tin Plate Company, Mansfield, Ohio.

In the early days of the automobile, steel sheets from the most common finish, known as one-pass cold rolled and annealed black, to ordinary pickled, cold rolled and annealed grades, were used by the automobile manufacturers and part makers; practically all of these sheets were then produced from Bessemer steel. These sheets, at that time, represented the regular commercial product of steel used so generally for all kinds of sheet metal requirements. In fact, they were the only qualities that the steel mills were able to offer. The automobile industry found it possible to use these, owing to the fact that their designs of bodies, fenders, hoods and other metal parts were very simple, requiring but little forming of the material.

As the automobile industry grew, each successive year presented new and improved designs, many of these being difficult parts which had to be specially drawn or formed. The steel manufacturer, recognizing these demands, met the situation quickly by having their experts give particular attention to the development of special analysis steel, as well as special finished steel, so as to satisfy each individual requirement.

This necessitated special furnaces for the production of the proper base of open hearth steel, all of which had to be of low impurities, of proper chemical and physical properties. Then it became necessary to have special mills for the rolling of this steel into sheets. All of this brought about the building of specialty sheet mill plates, making it necessary to operate same independently of the common sheet steel products. There are very few of these specialty sheet mills in the world. In fact, they are all in this country, American ingenuity making all of this possible.

No matter how difficult a problem the ever-efficient automobile engineer has presented to the specialty sheet manufacturer, they have all in time been solved by supplying qualities to meet their specifications. In doing this it became necessary for all such mills to properly train their rollers, matchers, doublers, annealers, and in fact everyone employed in the production of automobile sheets, thus enabling them to handle with great care all of this specialty business.

Co-operation on the part of the steel makers and automobile manufacturers is very essential. The former will always advise and recommend the proper steel after knowing the latter's methods in manufacturing and finishing the various sheet metal parts.

Automobile sheets are classified in qualities as shown below, each being especially adapted for the part or parts as listed, so as to give proper workability in forming, drawing, and of the best surface finish, permitting of high class enamel or paint effect:

(1) Automobile Body Sheets, Regular Quality

(2) Automobile Body Sheets, Deep Drawing Quality

(3) Automobile Body Sheets, Extra Deep Drawing Quality

(4) Automobile Flat Fender, Hood, Splash Guard, Apron and Door Sheets

(5) Automobile Crown Fender and Cowl Sheets of Deep Drawing Quality

(6) Automobile Crown Fender, Cowl and Radiator Casing Sheets of Extra Deep Drawing Quality.

Automobile Body Steel

All body steel is preferred in what is known as the dark velvet finish surface, and as indicated in the above classification there are really three different qualities of automobile sheets, these being regular quality, deep drawing quality, and extra deep drawing quality. The regular quality is used on all flat work, and for such parts as require but very little drawing and forming. The deep drawing quality is necessary for jobs of shallow drawing or forming, such as back and side panels. The extra deep drawing quality, however, is a special analysis steel, and sheets are specially treated for difficult and extremely deep drawing operations, such for instance as wheelhouses, seat backs, etc. The dark velvet finish given on all of these qualities is particularly desirable for hand coating, the surface of the sheets being more or less open to hold or absorb the painting operations, such as priming, rough stuffing, and paint or enamel which requires no baking.

Automobile Flat Fender, Hood, Splash Guard Apron and Door Sheets

This quality requires a much higher finish than any of the automobile body stock, and this is due to the fact that the aforesaid mentioned parts are always japanned or enameled and then baked. The sheets in this grade are closer surfaced than the body stock. By this we mean they have a brighter or more lustrous surface than the body material. They are not expected to stand any particular drawing or bending and should always be ordered for comparatively flat work. The primes in this quality are always suitable for a two-coat enamel finish, while the "seconds" are invariably given a three-coat enamel finish.

Crown Fender and Cowl Sheets

These carry a high surface finish, and are especially prepared in deep drawing and extra deep drawing qualities, whichever the demand calls for. All of these sheets are specially treated in the same manner as the deep drawing and the extra deep drawing auto body sheets, so that when drawing the material, stretcher strains or streaks do not show after the various operations.

Roller and Stretcher Leveling

All grades of automobile sheets are always roller leveled in regular practice, and this is for the purpose of eliminating any buckles or waves that might show in the finished

(Continued on page 21)

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Waterproof and Water Resistant Glues

By LAWRENCE OTTINGER, Formerly Assistant Chief of Glue and Plywood Sections, Bureau of Aircraft Production

The world's progress is closely related to its great wars. Out of the misery, toil and destruction are born new and better methods, fathered by necessity. The Forest Products Laboratory at Madison, Wis., has conducted thousands of tests and experiments with specially designed equipment and a technical personnel, at a cost in time and money which few, if any, commercial organizations could afford.

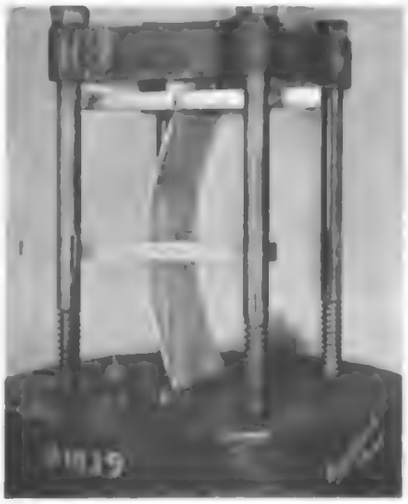
One of the first problems to be solved was



THE TOUGHNESS TEST.
Testing Resistance of Thin Plywood to Impact.

the production of material for aircraft fabrication. Plywood proved by far the strongest material per unit of weight. It is from four to eight times as strong as steel. Of the plywood available there was none which would withstand the conditions ranging from Arctic cold to tropic heat, from drought to the saturation point, met with in aviation. There was required a waterproof glue which would stand great heat, and be stronger than the expanding power of the veneer or laminæ.

The gelatine and vegetable glues are not waterproof, because they are dissolved in water, and set or harden by evaporation, without undergoing a chemical change in the process, and they will again wholly or partially dissolve if exposed to sufficient moisture. The waterproof glues set by chemical action, and produce an entirely new combination of elements, which is insoluble thereafter, the evaporation of the moisture being incidental.

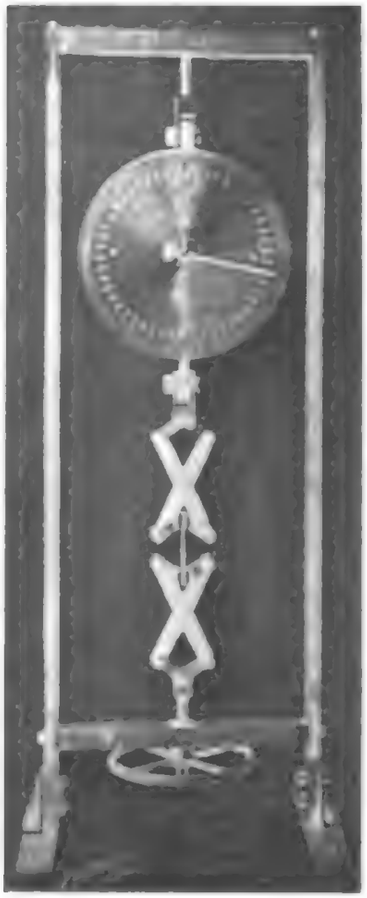


BENDING TEST.
Finding the Longitudinal Breaking Point



VENEER SPLITTING MACHINE
Showing Method of Making the Test of Force Required to Split Plywood.

Of the waterproof glues developed, there are two groups, the blood albumen and the casein. Both were brought to a point where they easily passed the required tests, which were boiling for eight hours, soaking for ten days, baking at 212 degrees Fahrenheit, and



Shear Testing Machine for Plywood.

with a minimum shear strength of 150 pounds per square inch. (B. A. P. Specification 15034-B). The blood glues are made of slaughter-house blood, to which chemicals are added, and it is applied cold with a brush or carpet-covered spreaders. The panels are then placed in hydraulic hot plate presses, and the blood coagulates at 180 degrees F.

Casein is made from milk. The butterfats, whey and sugar are removed, and either acids or rennet are added in the presence of heat. This precipitates the remaining solids, which are then dried and pulverized, which is casein. The casein glues come in the form of a single powder, which is added to cold water. The glue is then ready for use, and

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is applied exactly as the animal or vegetable glues, and with the same equipment, excepting that no heat is required in either the preparation or application, nor is the wood wormed. A mixer of the type used by bakers is the only additional equipment needed, and they may be obtained from several manufacturers at little expense, depending on the size required.

The casein glues test well over 2,500 pounds to the square inch on maple joints, which is higher than the best hide glues. Its use is not confined to woodwork, as it will hold glass to glass, wood to glass or steel, fabric to either, veneer to metal, cork to wood or metal, etc.

For the vehicle body builder, waterproof plywood offers remarkable opportunity for stronger, lighter and cheaper bodies. One of the largest body builders in Detroit made the remark that steel would never have been used, had waterproof plywood been obtainable in the early days of the motor car. As it can be moulded to practically any shape after steaming or boiling, quantity production between male and female members is entirely practical, or the material may be nailed to ribs or roof beams in soaked condition, and will resume its original condition, while adopting the shape in which it dries.

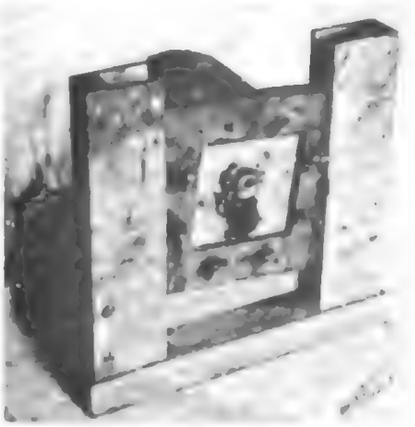
It may be had in unlimited size, so that a top may be made of it, much lighter and at less cost. The finish is right on the wood, no canvas or aluminum being required. For running boards, battery boxes, dashes, etc., its use is obvious. One concern is making wheels of the disc type, by glueing veneer with Casco casein glue, and moulding to shape.

It is probable that no lumber product has ever been offered to an industry before, with so much technical and practical information to be had for the asking. There are complete engineering tables on the strength of various constructions of all of the commercial veneers, their weight, the effect of vibration, their action under every imaginable stress and strain, and in this connection it might be well to consider that it is almost impossible to dent a panel, and if broken, it is as easy to repair with waterproof glue as to spot-weld metal. It is easily fireproofed with ammonia crystals.

Some of the tests made, and the instruments used by the Forest Products Laboratory are shown in the accompanying series of engravings.



The Sand Load Test on Thin Plywood.



THE TEARING TEST.
Measuring the Time Required to Tear Plywood.

Automobile Steel Sheets

(Continued from page 19)

sheet. Should an absolutely flat sheet be required, and this is often the case for such parts as decks and some splasher guards, or for a panelled delivery car, then it becomes necessary that they be specified as stretcher leveled or patent leveled. In this operation the steel is stretched practically to its elastic limit, and hence, "stretcher leveled" sheets should never be used for drawing work.

Oiling for Rust Prevention

It is most economical to have all highly finished sheets oiled. This as a rust preventative during transportation, storing, and in handling and manufacturing of various parts. Atmospheric phenomena, such as condensation, oftentimes occur while sheets are in transit, and furthermore, should any moisture seep through the car, sheets when oiled are then better protected from the attacks of oxide. Perspiration and hand marks, as well as scratching in handling, are largely avoided when the sheets are properly oiled, and it is always recommended to carry this oil on the sheets throughout the various manufacturing stages, and until such a time that the part is ready for priming or enameling, when the oil is readily removed by a little gasoline.

Resquared Sheets

If it is necessary to have sheets square on all four corners, then they must be ordered "resquared". Otherwise, the usual variation of one inch to two inches in length and quarter inch in width must be allowed. It is often requested to resquare sheets after stretcher leveling. By this is meant resquaring or reshearing of the grip marked ends caused by the patent or stretcher leveling machine. In many cases, however, buyers do this resquaring themselves after having the sheets come to them with the grip marked ends.

Specifications When Ordering

Unless automobile sheets are ordered in carload lots, they should always be crated, as otherwise they will surely become more or less damaged in transportation, by dragging from car to depot platform, and neither will the shipper nor the carrier guarantee against such damage.

All sheet steel is rolled to U. S. standard gauge, and this should always be used. It is also necessary for a buyer to always specify their automobile sheets under the classification to which they belong, and in addition to this state to the mill just what the sheets are to be used for, and whether the part or parts made from the sheets are to be painted, enameled or given some other special finish. Buyers should never hesitate to pay the deep drawing or extra deep drawing extras for the respective drawing jobs, as the loss in manufacture and production usually amounts to more than these higher qualities of sheets will cost.

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"Vehicle Monthly" Time Savers

"The Vehicle Monthly" will appreciate the receipt of any "Time Saver" made by its readers.

A rough sketch and a short description are all that is necessary.

(This series of "Time Savers" was begun in February, 1919. Back numbers may be had from the publishers)

"Vehicle Monthly" Time Saver No. 26
REMOVING STUDS

Studs should never be removed with a pipe wrench, as this method is liable to destroy the thread. A simple stud remover comprises a long nut tapered to fit the stud, and a cap screw. The nut is screwed half way down onto the stud it is desired to remove and the cap screw employed to lock it in place. By applying a wrench to the long nut, the stud may be removed and replaced with ease.

"Vehicle Monthly" Time Saver No. 27
REPLACING CORK INSERTS

When worn or lifeless, cork inserts should be replaced. This may be done by means of a metal tube slightly smaller than the insert opening, and tapered to fit into it as shown. To use, the cork is replaced on the tube and pressed into place with a plunger. Before inserting the corks, they should be soaked in warm water.

"Vehicle Monthly" Time Saver No. 28
ONE MAN SPEED WRENCH

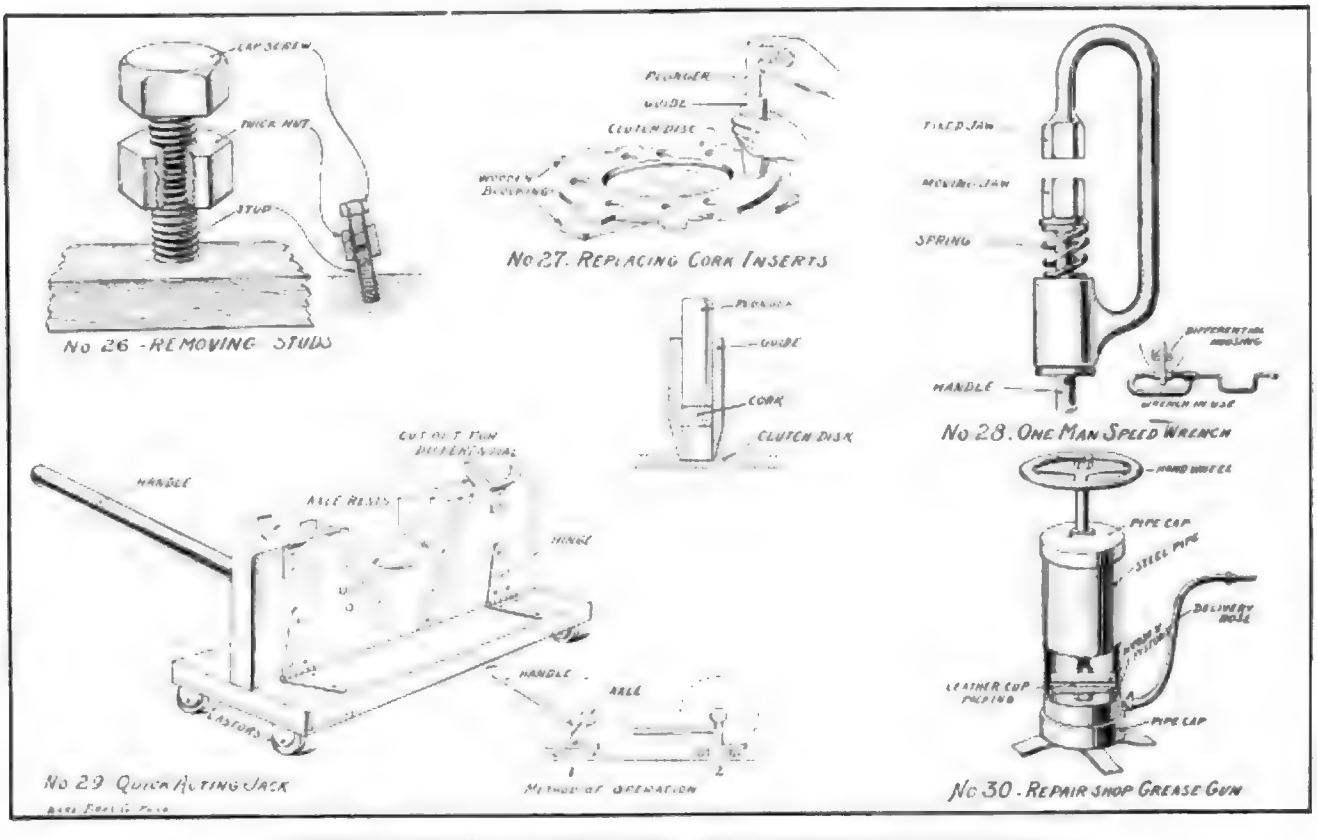
Where considerable work on one make of car is carried on, a one man speed wrench will greatly facilitate parts of the work. By it, bolts and nuts on flanges, such as differential housing bolts; crank case bolts, gearbox bolts, etc., may be quickly removed or replaced. It is a common bit brace socket wrench, having a secondary jaw, spring operated, that extends around the flange and holds the nut or bolt head.

"Vehicle Monthly" Time Saver No. 29
QUICK-ACTING JACK

In handling light cars, such as the Ford, Maxwell, Dodge, Chevrolet, etc., a quick-acting caster jack is advantageous. A simple jack of this type consists of a flat plank mounted on castors, carrying a hinged upright, lever-operated, to which are attached metal rests. The car is quickly raised by sliding the rests beneath the axle and prying down the handle, raising the car.

"Vehicle Monthly" Time Saver No. 30
REPAIR SHOP GREASE GUN

Rear axles and gear boxes may be quickly filled if a large portable grease gun is available. One such is illustrated herewith. A six-inch bowl steel pipe is threaded at each end, fitted with pipe caps, and a wooden leather cupped piston fitted. This piston is operated by a screw threaded through the cap, and carrying a hand wheel. Many pounds of grease may be carried at once; and the amount used is the difference in weight before and after using.



"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ON THIS PAGE

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BODY DEPARTMENT

59,000 VEHISOTE paneled or closed delivery bodies have been built in the last two years; each one speaking a good word for VEHISOTE.



VEHISOTE is in one piece and provides a smooth jointless surface which is absolutely water-proof and cannot split or separate.

VEHISOTE is a homogeneous individual material made by a distinctive and special process.

Like Steel, VEHISOTE is made by a fluxing and moulding process which interweaves and interlaces the fibres in one complete fabric.

When ordering a new body or replacing defective panels on your present bodies, personally see that VEHISOTE is used.

Samples and Information Gladly Given Upon Request

THE PANTASOTE CO. 11 Broadway NEW YORK — Peoples Gas Bldg. CHICAGO — Penobscot Bldg. DETROIT

JOBBERS

The Scovel Iron Store Co., San Francisco, Cal.
Sligo Iron Store Co., St. Louis, Mo.
E. D. Kimball & Co., Chicago
E. C. Kadow & Co., Chicago
E. J. Coyle & Co., Chicago
C. H. Tiebout & Sons, Brooklyn, N. Y.
N. Langler & Sons, Brooklyn, N. Y.
H. D. Taylor & Co., Buffalo, N. Y.
W. E. Kleine & Co., New York City
H. Hett & Sons, New York City
W. T. Crane Cge. Hdwe. Co., Newark, N. J.
Gerhab & Ludlam, Philadelphia, Pa.
Chas. Schick, Trenton, N. J.
Mossman-Yarnelle Co., Fort Wayne, Ind.
Wm. Stockhoff, Louisville, Ky.

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Motor Bodies and Parts

BODY WEIGHT ALLOWANCE, ETC.

The National Automobile Chamber of Commerce reports that at a meeting of the Truck Standards Committee in New York, June 5, 1919, the following preamble was given consideration.

How often we have delayed matters in the past by getting the cart before the horse.

In place of the horse we now have the motor truck with the cart on its back.

The danger now lies in a tendency to get the truck before the cart, or in other words, to sell the truck chassis before the truck body is definitely laid out.

Keeping in mind the table of standard body weight allowances, and balancing up with the prospective owner's requirements, the truck body is the measure which should be used to determine the type and size of truck chasses that must be purchased.

This, of course, applies to the retail salesman, and we should make a very determined effort to impress this individual with the importance of selling the truck body and definitely determining its size and probable weight and the weight of the material it will carry before he quotes chassis prices or furnishes chassis specifications.

For until he has the body specifications nailed down, the salesman is not in a position to decide what he should offer in the way of a truck, tractor or trailer chassis. In reaching this decision the salesman should of course have in mind the question of delivery and the stock of chassis which he has on hand.

We can think of many instances where it will be extremely difficult for the salesman to get body specifications in advance, but if we will examine each instance carefully and make an attempt to overcome these difficulties, we will succeed in the end in eliminating many of the diseases which now retard the growth of motor vehicle transportation.

We have adopted new standards for body weight allowance. If we agree that these amounts are practical, we should take steps to convince retail salesmen and body builders that excess body weight must be deducted from load carrying capacity as explained in our circular on caution plates.

We recommend that the N. A. C. C. should communicate with the organization of truck sales managers, recently formed, and ask for their co-operation along these lines.

We are asked by the S. A. E. to determine suitable practice in the use of truck capacity caution plates. We believe that the present plate provides space for all of the information that can be required. We recommend that the N. A. C. C. should issue a bulletin to its members recommending that manufacturers supply the six weights which they are able to furnish at the time the chassis leaves their factory, and that they shall insist that no chassis shall be actually shipped until these six weights have been stamped on the plate.

We further recommend that the N. A. C. C. through proper channels shall take steps to co-operate with the motor truck license bureaus of the various States, to the extent that no motor truck license shall be issued until the motor vehicle has been inspected by the Motor Vehicle Commissioner or his duly appointed representative, and that inspection shall show that the eight weights called for have all been stamped on the plate.

We recommend the following changes in the original standards adopted in 1912 for motor trucks by the National Automobile Chamber of Commerce.

1. *Standard Demonstration Charges.* We recommend that this table be eliminated.

2. *Standard Speed Rating.* We recommend that the present table be eliminated and that the following table be adopted:

Gross Weights, Chassis, Body and Freight Load	Speed, Miles per Hour
Pneumatic tires up to 28,000 lbs...	25
Solid rubber tires up to	
4,000 lbs.....	25
8,000 "	20
12,000 "	18
16,000 "	16
20,000 "	15
24,000 "	15
26,000 "	15
28,000 "	15

Note.—These speed ratings should be recognized by the manufacturer as the maximum and not exceeded under any conditions. The manufacturer should stamp on the truck caution plate the actual maximum speed with load for which the truck is built and beyond which the truck is not guaranteed.

3. *Standard Body Weight Allowances for Motor Trucks.* We recommend that the present table be eliminated and that the following table be adopted:

Load Tons	Body Weight Allowance, Pounds
1 ton	
1½ "	1200
2 ton	
2½ "	1500
3 ton	
3½ "	2000
4 "	
5 ton and over	2500

We recommend that no change be made in the note which now accompanies the table on standard body weight allowances.

4. *Standard Frame, Widths and Lengths for Motor Trucks.* This table has been referred to the Truck Standards Committee of the Society of Automotive Engineers for revision.

5. *Standard Caution Plate for Motor Trucks.* Committee recommends that the present form of plate should be retained, and that the six footnotes should be retained with the exception of the note headed "Speed Rating", which should be revised to read as follows: "The figures given in the table headed 'Standard Speed Ratings for Motor Trucks' should be recognized by the manufacturer as the maximum and not exceeded under any condition. Manufacturer should stamp on the truck caution plate the actual maximum speed with load for which the truck was built and beyond which the truck is not guaranteed."

As stated above, truck manufacturers should be responsible for six of the weights which are called for on this plate, as follows:

Freight load capacity,	Standard	
Body weight allowance,	Standard	
Weight of Chassis,	Standard	Actual
Total weight,		
chassis body and load	Standard	Actual

The truck manufacturer, his distributor, dealer, or agent should be made responsible to see that the body is weighed and that the plate is stamped—

Freight load capacity,	Actual
Body weight allowance,	Actual

The bulletin issued to Chamber members should lay great stress on these last two weights which are now supplied in very few instances.

As mentioned above, the Chamber, through proper channels, should suggest to the motor truck license bureaus of the various States that it will be possible for them to reduce road wear by insisting that the truck be equipped with a plate stamped with all eight weights and submitted to a representative of the State Motor Vehicle Commissioner before a license is issued.

Meeting of Philadelphia Motor Body Builders

The regular monthly meeting of the Carriage, Wagon and Motor Builders' Association took place at the Hotel Hanover, Philadelphia, on Friday evening, June 20th. The principal business brought up was the question of revision of the constitution and by-laws to accord with the changed conditions in the vehicle industry. After an interesting meeting the members enjoyed their usual monthly "get together" dinner.

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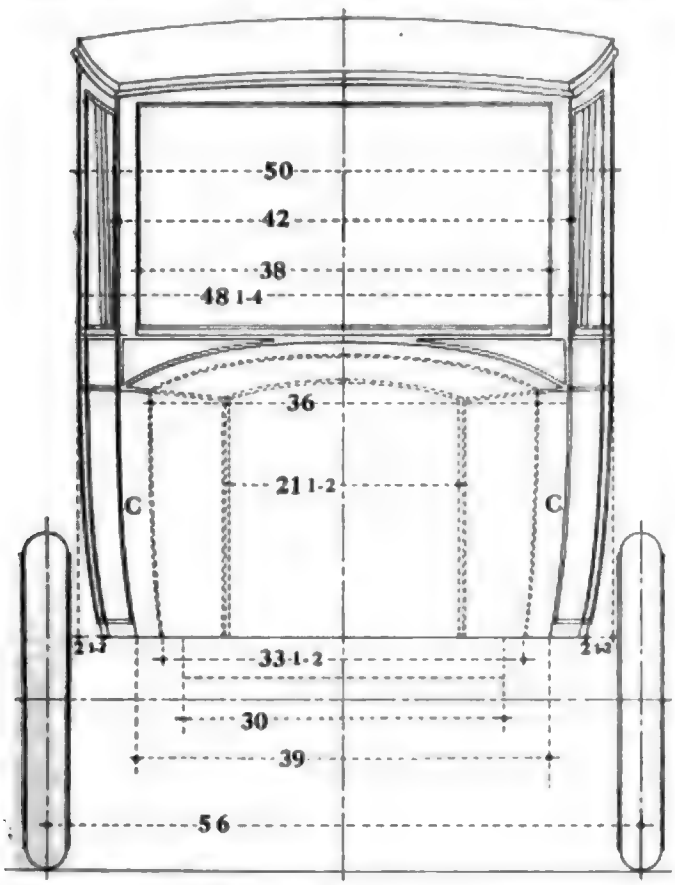
Five Passenger Sedan Body

Fitted to the Norwalk Motor Car Company's Chassis

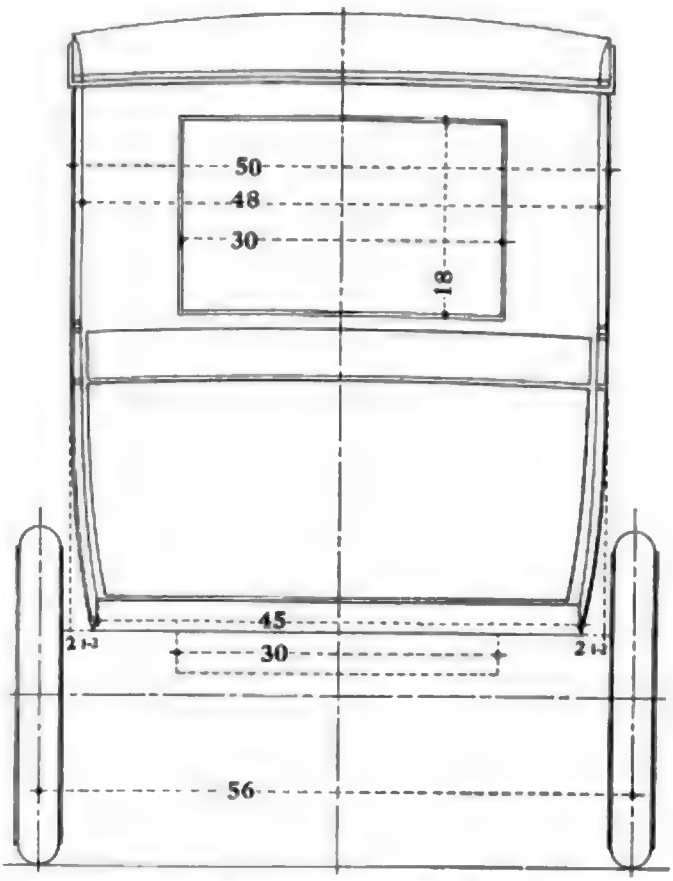
The chassis of the Norwalk Motor Company, Martinsburg, W. Va., is specially built to suit a five passenger touring car or sedan body for length, being 82 inches from front of dash to center of rear wheels.

Note the various spaces relative to seating capacities. From front of dash to front edge of driver's seat, 28 inches. From front bottom edge of driver's seat to bottom edge rounded and is narrower than the width of body, but the leg room is 25 inches between the two seats and the depth of main seat is 24 inches. This same comfortable space is given for the widths of seat, that is, across. The body is 50 inches wide outside, and as there are only 2½ inches turn-under on each side, this fact increases the widths across the seats considerably.

Starting from the front on hood, note the width on bottom view, which is 21½ inches, vertical on each side and curved on top as shown on front view. Across dash the body and hood are 36 inches wide across top, and 33½ inches across bottom, which will give 1¼ inch turn-under on each side. This "twist" of 1 inch is very easily hammered out, and as the top of the hood is a regular curve, which is also easily accomplished without a great deal of expense, it can be considered one of the least expensive hoods made.



Front View of Five Passenger Sedan Body.



Back View of Five Passenger Sedan Body.

on rear end at center, 21 inches. Space between the two seats at bottom edge, 25 inches; and main rear seat, that is the cushion itself, is 24 inches deep, with a space back of it of 2 inches on level of seat, making the seats exceedingly comfortable.

Note the position of doors in relation to the seats. Open the front door and there is 11 inches space to entrance, that is 11 inches between inside surface of door pillar, at bottom edge and front edge of seat. There is more space at the height of fence rail, where the space is needed. If these front doors are hinged, the opposite way from the one on the working draft, the entrance space will be considerably increased.

Observe that the back on front seat, being 9 inches back of hinge pillar joint, leaves 12 inches to enter, but this space is considerably increased, because the back of seat is

The front seat can be made in one part, or in two parts, divided in the center, to permit moving from the front to the rear seat, or from rear to front seat. This expense can be avoided, being considerable, because there are four doors in the body, but the convenience is lessened, because if the passenger on rear seat wants to change seats he must step outside of rear door and enter the front door. The space between the front seats, if divided, should not be less than eight inches.

Comfort and Simplicity the Object

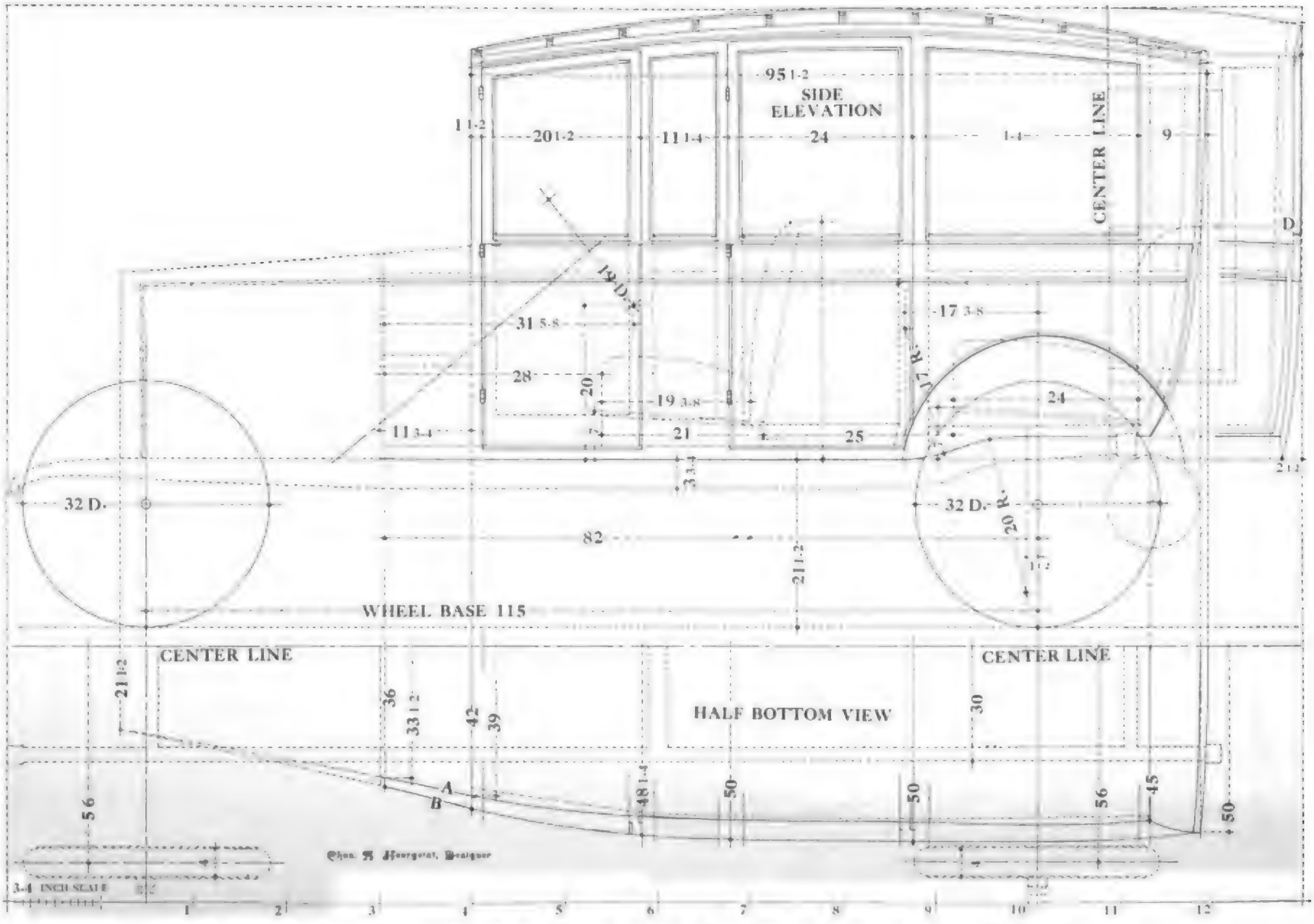
We have shown above and proved by actual dimensions that comfortable seats can be installed, but simplicity of construction in building the body is equally important when expense and quality are taken in consideration on a wood paneled body.

The Construction of the Cowl

In almost all cases the cowl is metal-covered on account of the shape, and wood panels are out of the question, but on this body it is perfectly feasible and less expensive when a custom order is considered. This cowl, as we said before, is 33½ inches across bottom and 36 inches across top, and at rear end the width across bottom edge is 39 inches and 42 inches across the top. All these widths can be seen on half bottom view and on front elevation.

According to these dimensions the amount of turn under front of body or at rear end of hood is 1½ inches on each side. Note the shape of the cowl A B, half bottom view which is nearly straight lengthwise; same with turn under lines C C, front elevation. A one-quarter inch thick poplar panel is easily

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WORKING DRAFT OF FIVE-PASSENGER SEDAN BODY, FITTED TO THE NORWALK MOTOR COMPANY CHASSIS.

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bent and glued over the cowl with grain up and down; this requires a panel only about 13 inches wide.

The curved top panel, which is also one-quarter inch thick poplar, is bent over a form with the grain lengthwise. When this is done there are no joints shown except on the ends, which are covered with moldings. If the grain is taken lengthwise with the cowl, no form over which to bend the panel is necessary, but at least one joint in the center of cowl is necessary, which is objectionable, because if the joint should open it is easily noticed.

The panels on side elevation can be glued either with grain lengthwise or up and down, except the rear side quarter panels, which must be glued on lengthwise with the grain. The belt panels are glued on separately and all joints are covered with moldings. The back panels are put into the grooves and the lower joint across covered with a curved molding. The upper rear panels are glued with grain up and down and mitered at the corner pillars. The strainers are put in to suit the direction of the grain. On the cowl the strainers are shown in dotted lines as they are on the side quarters, as the panels cannot be put on otherwise.

Body Frame, Pillars and Rails

Each sill is made of three pieces; there is the large front part, 1¼ inches thick, 10½ inches wide, and 6 feet, 4 inches long. The rear end piece is 1½ inches thick; 10½ inches wide, and 4 feet long. The piece between each sill is 1⅝ inches thick, 10½ inches wide and 1 foot, 3 inches long. With this width the sills will rest on the frame. The cross bars are put where needed, and not interfering with the chassis parts. The bottom boards are rabbeted into the inside edges of sills.

The front pieces of cowl are ⅞ x 4 inches and lapped together; the cowl strainers are ½ x 1¾ inches. The front pillars have 1½ inches turn under and are therefore of different shape from the door pillars, for which a separate pattern must be made. But the inside surface of this front pillar must be same as the door pillars. This will make the pillars heavier on lower end than the door pillars because one inch less turn under is added to the outside surface. The inside surfaces of all the pillars must be alike, otherwise it will twist the window glass and frame.

Across the front, the inside surface above the fence rail is vertical, and into this the windshield is fitted. Below the fence rail it runs in the same direction as the door pillars. These pillars are 1½ inches thick and straight across on both front and back surfaces of pillars. The front door pillars, or hinge pillars, are 1¼ inches thick; dressed straight across, beveled inside to meet the contracted line and on outside to meet the shape of top and bottom side curves of body.

The front door lock pillars are 1¼ inches thick, dressed straight across, beveled inside to meet the contracted line, and outside to meet the shape of top and bottom side curves of body. The front lock pillar, with the standing pillar next to the lock pillar, has 2⅛ inch turn under or ⅛ inch less than the rest of the door pillars. The hinge standing pillars and the lock standing pillars are dressed in different thicknesses; the lock standing pillars are 1¾ inches thick, and the hinge standing pillars 1½ inches thick. They are dressed straight across, contracted inside and beveled outside after the side curve.

The rear door pillars are dressed 1¾ inches thick, with square inside and outside surfaces. The lock standing pillars are dressed 2 inches thick and are squared inside and outside. The rear standing pillars are dressed 1½ inches thick, beveled after the contracted line inside, and after the body side curve on the outside.

The fence rails are made of different thicknesses, depending on the kind of glass frames used. If the old style is used, the rails are ½ inch thick on inside surfaces of door pillar as shown on D. Rear of side elevation is curved and the wood glass frame is made to turn. In this case 2⅛ or 2¼ inches across the fence rail will drop the glass frame, but when made with a mechanical glass lifter the size of pillar at D cannot be less than 2¾ inches. Besides this depends upon which kind of mechanical system is used, as there are several on the market. When wood glass frames are used, the thickness of rails at the shoulder is ⅜ inch and if there is side curve, the amount of curve is added to the ⅜ inch.

The belt rails below the fence rails, where the panel joint is, and the molding which covers the panel joints, are ⅝ or ¾ inch thick at the tenon shoulders, added to the amount of curve, if there is any. These rails are mortised into the door pillars, same as the fence rails. The thickness of upper door rails, as well as the fence rails, depends upon which system is used, same as explained with the fence rails. These upper door rails are mortised and lapped to the door pillars.

The top rails are curved 2 inches deep as shown on side elevation, and outside curve same as shown on half bottom view. The inside surface of top rail is shown in dotted lines on half bottom view and its thickness is 2 inches at each pillar joint. A straight line is drawn from each joint.

The top is covered either with plywood or agasote, but they must be ordered to the required shape.

Preparation of Stock for Bending

To render wood pliable, both moisture and heat are required. Neither of these factors is fully effective in the absence of the other. There should be moisture enough, experiments at the Forest Products Laboratory indicate, to saturate the cell walls, which amount is equivalent ordinarily to a moisture content of 20 to 30 per cent. No better effect is noticed where there is additional water in the pores or open spaces of the wood.

The pliability of wood apparently increases quite rapidly with increase of temperature. Very high temperatures, such as accompany steam under pressure, however, are not advisable, since they render the wood brash; in fact, boiling for any length of time permanently reduces the strength and toughness of wood to small fractions of their normal values.

Treatment of Dried-out Stock

Freshly cut stock is, of course, thoroughly saturated and needs no additional moisture. Only heat is required to produce flexibility. If the stock has dried for a long time, it will have a uniformly low moisture content throughout, probably about 12 to 15 per cent. Such material requires the addition of a considerable amount of moisture before it is in proper condition for bending. If the stock has dried for a shorter period, the interior part may be at a high moisture content while the exterior surfaces are quite dry. Such stock needs the addition of sufficient moisture to bring each part of it up to about 25 per cent.

Condensation of the steam may not furnish sufficient water if the stock is very dry; in this case the addition of a hot-water spray to play on the stock in the steam box would be advantageous. Admission of the steam through water will insure its being thoroughly wet. Pressure steam probably adds little if any to the moisture content. During steaming, the stock should be so piled that steam has access to all sides of each stick.

Preparation of Bending Stock in the Hot Press

The following is an extract from an interesting letter recently received at the Forest Products Laboratory from a chair manufacturer, regarding the preparation of stock for bending in a hot press:

"We use a horizontal retort for steaming our wood before bending. We previously had been using fairly green lumber with a high moisture content steaming it with live steam about 30 to 40 minutes at 5 pounds to 10 pounds pressure and then bending. Our breakage averaged around 15 per cent. on lumber about ⅛ inch thick. Recently we experimented along the lines of filling the lower part of the retort with water, through which the steam had to pass, and raising our grates to keep the material out of the water. We found by experiment that we got the best results by this method and by carrying no pressure on the inside of the retort and steaming about four hours before bending. In this way, on lumber 'bending dry', we reduced our breaking to about 5 per cent. We have just bent some ¾ inch mahogany (Cuban) over two years old in this way, with about 10 per cent. breakage."

Attwood Brass Works Expansion

The Attwood Brass Works, manufacturers of automobile mountings and special brass work, Grand Rapids, Mich., have bought the modern two-story concrete factory building in the above-named city formerly occupied by The Steel Furniture Co. The Attwood company will occupy all the space with their different departments, and have also purchased fifty feet of ground additional to take care of expansion. The company is now in fine shape to take care of their fast growing trade.

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Close-Coupled Touring Body Mounted on Cadillac 125-inch W. B. Chassis

BY GEORGE J. MERCER

At the shows this year it was pretty well demonstrated that little cars were popular, and judging from all sources of information it will be quite proper to have small bodies, both open and closed, for some time to come.

Special bodies cost more than the factory-made model, and unless there is a special reason the factory-made model body will generally serve the purpose, especially if it is a good-looking job and well made, as the bodies of the Cadillac are.

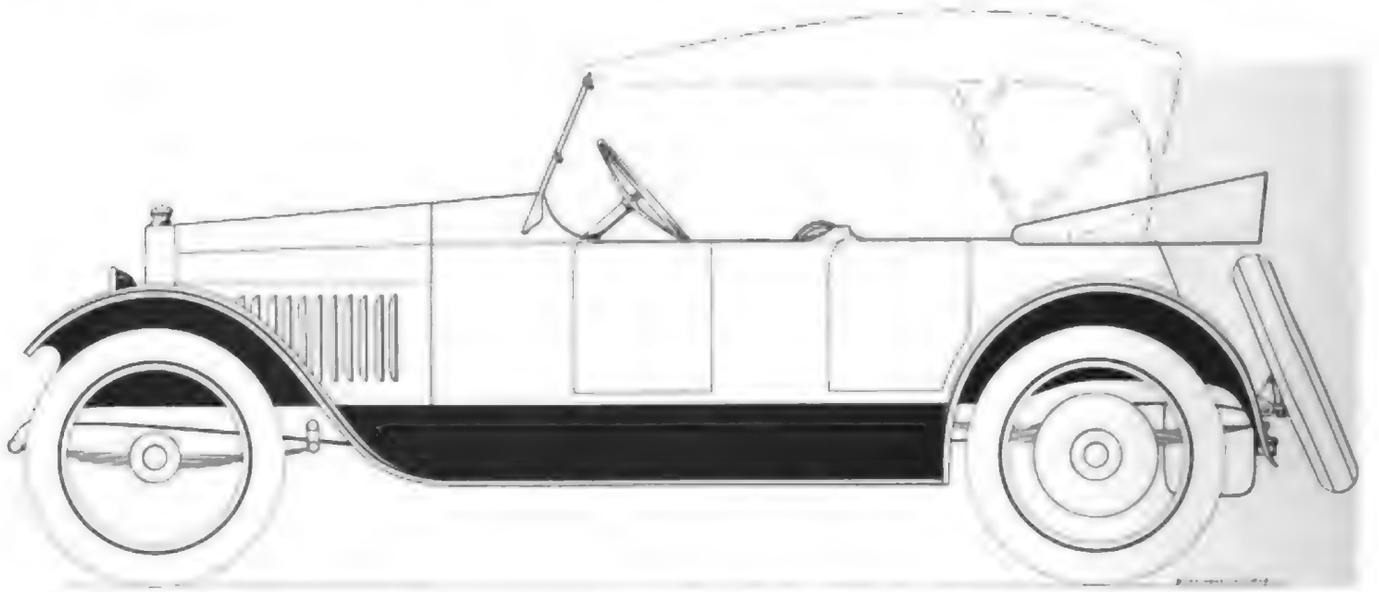
The picture of the car assembled will convey the true aspect of the design. We have the slanting windshield, low-looking sides and top and the second cowl. The entire body has the look of being below the cowl, and this always helps to get that low appearance that the public wants.

The working plans include the side elevation, top, back and front views, with the general dimensions indicated by figures.

This body has the bevel top edge, and the

The Side Elevation

On this side elevation, the top, windshield and the cushions and backs are outlined. This job is essentially for four passengers, so the rear cushion will be 42 inches wide. Allowing for 1½ inches thickness of trimming each side, there is room for locker space back of the front seat, and this box will have on its face in the center the watch and step light. The distance between the box and the back of the rear seat is 30 inches, so there is



CLOSE COUPLED TOURING BODY MOUNTED ON CADILLAC 125-INCH W. B. CHASSIS

However, there are always some people desire something different in bodies. Possibly they may have met with an accident and the old body has been damaged or they may own a last year's car that needs a little dressing up, and it is for such that the design illustrated is intended.

Treatment of the Body Lines

The small touring body does not take up all the room of the chassis length, and therefore the end, at the rear of the design shown, is one way of using up this space and yet having the body appear long enough for the car. Also this space can be utilized for carrying room. True, the access is only to be had through the back of the seat, but for things that are not wanted often this is not such a bad arrangement.

Also the shape of the rear conforms to the straight line of the side and the bevel edge of the top of the body side. The body top side line is continued straight through the hood and nearly to the radiator, and this will necessitate a new engine hood and the stock cowl of the car cannot be utilized.

second cowl is a continuation of the bevel of the sides, carried across the body at the front. The corner is carried out to the radiator nearly, and this will necessitate a new engine hood and the regular metal dash on the chassis will have to be built about one-half inch higher.

The front view shows the curve across the top of the cowl and the second cowl is shown on this view, as well as being lightly outlined on the side elevation, near its position on the body.

Between the rear door pillars the sectional pillar, showing the turn-under at this point, is located.

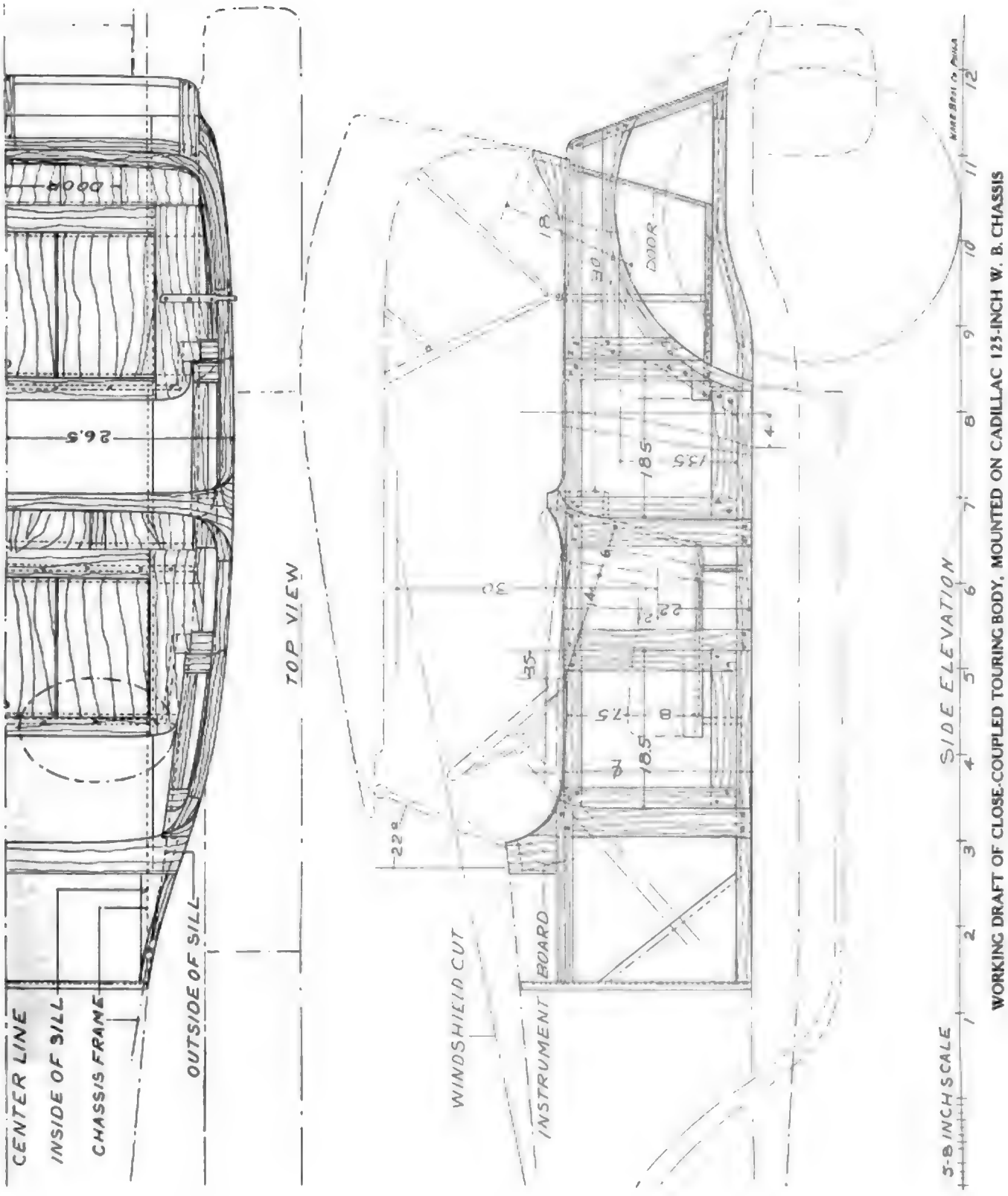
The doors on this body are similar to the runabout illustrated last month, and the same explanation can be applied to their construction, except that this body will be much better adapted to having the flush doors. It is a more expensive body and is more distinctive looking, and it will well pay for the additional cost to have the sides truly flush. The front and rear doors are both hinged at the front, using concealed hinges, which necessitates the heavy hinge pillar on the body.

ample foot and knee room, and yet the rear seat is so far ahead of the rear axle center that it will be as comfortable riding as the front seat. This body is moderate—its size is not extreme—but is so proportioned that the maximum of comfort can be obtained and yet all the occupants are close together.

The trimming on this job is intended to be thick, as there is ample room for same. On the top view the steering wheel is outlined, showing there is room beyond same on the side, to be sure that the arm of the driver will be free from the side curtains when up.

It will be noted that the rear door is cut away to clear the fender. This is partly due to the fact that the steering column is in the runabout position, being further back and lower down than the regular touring, but this position enables the seat and consequently the sides of the body to be lower, and gives a sport look to the job. The wheel being back, pushes the front seat back also and the second cowl always takes from the door space of the rear door. However, there is fair space for entrance to the rear, and, as this type of body is generally used by young

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WORKING DRAFT OF CLOSE-COUPLED TOURING BODY, MOUNTED ON CADILLAC 125-INCH W. B. CHASSIS

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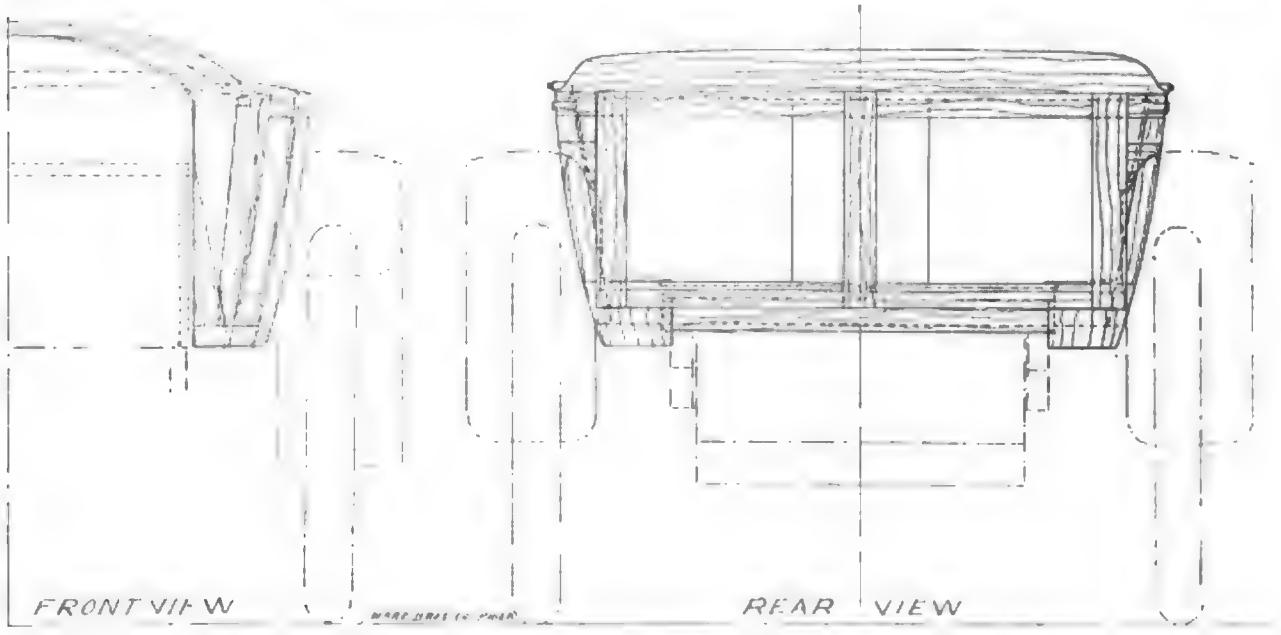
people, a slight impediment in the door space is amply compensated in the appearance that this design gives as a whole. Also as the idea is to have the exterior truly flush, the door handles are concealed from view by being inside. There is a tendency at the present time to have the door handles more accessible by reverting to the old form of having sensible outside handles, but for this body the interior handles will be more conducive to the effect desired.

We believe that the four views of the construction are sufficiently self-explanatory to convey all that the body builder needs to know to make up this design. The wood should be ash and the panels aluminum. There is a slight wheelhouse to receive the radiator will look extremely well to be silver finished.

The trimming will be leather, but it must be of the best hand-buffed, soft and Spanish finish, the design to be plain plaits. The door at the rear, for entrance to the luggage compartment, will be concealed between the plaits by having the opening vertically at a plait.

Preventing Damage to Logs in Storage

Logs stored on skidways or left in the woods during the summer months may be damaged in a number of ways, principally through sap staining, insect attack, decay, and checking. Certain species of wood are more



CLOSE COUPLED TOURING BODY MOUNTED ON CADILLAC 125 INCH W. B. CHASSIS.

fender, and the rear of the body is just the fender width between the inside dimensions, so that there is no cut-out to show from this position.

Construction of the Rear Seat

The top of the rear seat will be the most difficult part of the construction because it is "fussy." The part forming the seat top is bent wood, and is let down into a seat in the side rail. The usual method is to first turn the body panel over and into this seat, then cover the seat back independently and put this in its place. The joint then will be on the top and will not show, and there is no chance of its showing later on. The joint is wood to wood and metal to metal. The metal on the second cowl will require welding.

The design of this body will warrant the trimming and the painting to be a little out of the common. A bright color, preferably one of the beautiful greens that we see, will be very good and this can be lightened by cream or yellow striping and cream wheels. The wheel should be wire, and the metal finished parts in silver finish. In fact, the

susceptible to injury than others, and the extent of the injury is also dependent on the time of cutting, the climate, and the storage conditions. The possible financial loss and amount which can profitably be expended to prevent it will be influenced according to the United States Forest Products Laboratory at Madison, Wisconsin, by the value of the logs, the purposes for which they are to be used, and the probable extent of the injury. Where conditions permit, one or more of the following methods may be found useful in minimizing the loss.

Storing under water will prevent blue stain, checking, insect attack, and decay. (The logs would, of course, be subject to marine-borer attack in salt or brackish water along the sea coast where these pests are active.) Wood of any species completely submerged in water will resist decay indefinitely. Alternate wetting and drying, however, favor decay.

Storing on skids in such a way that the air can circulate freely around each log will prevent the accumulation of moisture and thus retard decay. It will favor checking, however, and, unless the bark is removed, will have little effect in preventing insect attack. The skids should be located where there is good air circulation, and they should be raised off the ground. Weeds and brush should be cut down.

To Prevent Insect Attacks

Peeling the bark completely from the logs will do much to eliminate insect attack and retard decay, by removing the protection required by many insects, and by allowing the logs to dry more rapidly. It will favor checking, however.

Painting the ends of the logs with paints of the proper kind will very materially retard the loss of moisture and thus retard end checking. If the logs are peeled and properly piled on skids, painting should not increase the danger from decay or sap stain. A yellow ochre or barn paint will do fairly well for this purpose.

Painting the peeled surfaces with coal-tar creosote will be useful in preventing sap decay, and if applied soon enough may be effective in retarding sap stain. Any grade of creosote in common use for wood preservation will be suitable, and expensive oils are unnecessary.

All the methods described except water storage may be employed at the same time and to good advantage if circumstances justify the expense.

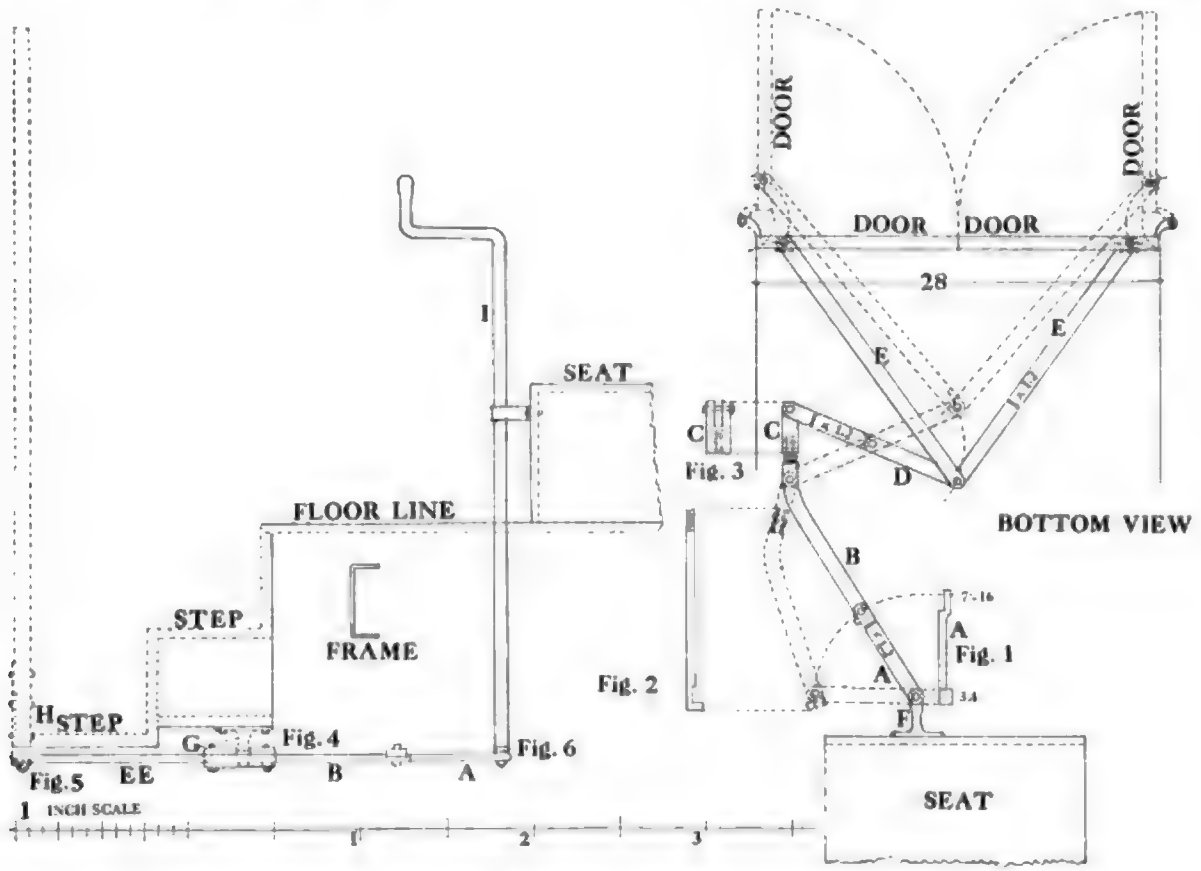
The Empire Axle Co. has reorganized with a capital of $400,000 as a subsidiary of the Watson Corp., Canastota, N. Y., with the following officers: President and assistant treasurer, O. F. Hakes; vice-president, chief engineer and assistant secretary, E. de H. Caldwell; sales and advertising manager, R. W. Foley.

Mechanical Door Operating Device

In our March, 1918, number, pages 14, 15 and 16, we published a working draft of a 24-passenger omnibus body with folding side doors, fitted to three bent hinges on rear end.

These folding doors have no mechanical fittings for opening and closing, and are locked same as carriage or automobile door-locks, from inside or outside, with door handles.

In our October, 1918, number, pages 22, 23 and 24, we published a working draft of a 50-passenger body with side doors on right side, on front end of body, with rear end



MECHANICAL DOOR OPENING AND CLOSING DEVICE DESIGNED BY E. R. H. TEETER, TRENTON, N. J.

entrance for lower part and stairway for upper seats.

On this working draft, the front door is 28 inches wide, recessed with steps inside of body, as shown on bottom view, but not covered. If operated by mechanical means this must be done from the conductor's seat, and if there is no conductor, it is arranged to be operated from the driver's seat.

The rear door is made to slide mechanically and is operated with the foot by the conductor, who is stationed at rear entrance collecting fares for upper seats. In case there is no conductor in front the fares of lower seat passengers can be collected at rear entrance. By the above we want to show how necessary it is to have mechanical door operating devices in public conveyances, but as the construction of body varies, the mechanical construction must suit the position of the door, driver's or conductor's seat, and other minor details.

Some systems are more complicated, where not only the doors are mechanically operated, but the steps also. Thus connections must be made, folding the steps upward with the same movement by which the door is actuated.

Teeter's Mechanical Door Operating Device illustrated, was designed by E. R. H. Teeter, body engineer for Fitz Gibbon & Crisp, Trenton, N. J., who build all kinds of private and public conveyances, using different systems to suit the construction of the body and the convenience of the passengers. The illustration is divided into part of side elevation, and part of bottom view, as indicated.

Lever A, Fig. 1, bottom view, is made of 1 x ¼-inch iron, with ¾-inch hole on lower end and ⅛-inch on top end. B, Fig. 2, side view, connecting with A, is made of ⅝-inch round irons. At lower end it has a stop lock, and on top end it is threaded and connected with Fig. 3. C, Fig. 3, is made as shown on bottom view, and connects with D and E. Making that connection, any lost motion can be taken up by removing the bolt at C and giving it one-half turn or more.

Part D is made as shown, and is secured to body steps, as shown in front view G, Fig. 4. D E E all connect at one point on bottom view. E E extends to bottom of door and is connected on part H, Fig. 5, front view.

The controlling rod and lever I, side view, operating the door, is 1-inch round iron, braced at F, and is ¾-inch square at lower end, Fig. 6. E E, A and B, side view, are the same rods as A and B, E E, bottom view. The door step P, on bottom view, when the door is open, is fastened to the connection of D E E.

A New Headlight Deflector

The Howard headlight deflector is the latest invention to eliminate the blinding glare from automobile headlights of approaching cars, with equal protection to drivers of road vehicles and pedestrians.

This deflector will be manufactured by the Howard Auto Headlight Deflector Co., Detroit, Mich., who are now arranging production for 1,000,000 to 1,500,000 sets a year. Exclusive selling rights will be inaugurated for all territory and export trade.

The Howard deflector is the invention of one of the pioneer automobile and truck manufacturers of this country; this attachment, simplicity in itself, with quantity production experience, will be marketed at an exceedingly low price

Restrictions now in force against foreign-made motor cars are very likely to be relaxed in France and England in the near future.

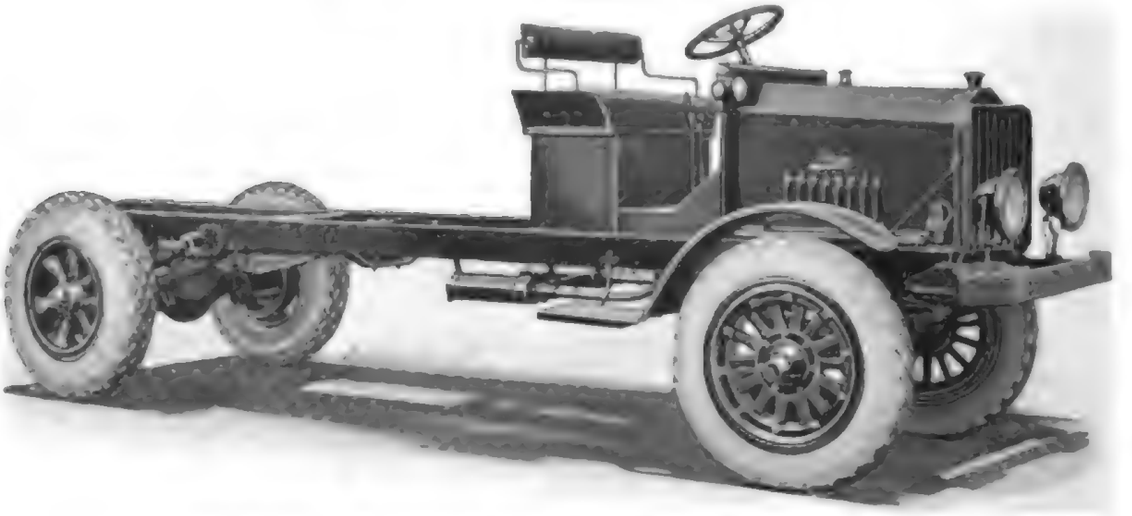
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ROWE 2-TON WORM-DRIVE MODEL C. D. W.



ROWE 2½-TON WORM-DRIVE MODEL C. D. W.



ROWE MODEL G. W. 3-TON HIGH SPEED PNEUMATIC TIRED CHASSIS

THREE ROWE TRUCK MODELS IN THE POPULAR 2, 2½ AND 3-TON SIZES.

Other models, carrying 3½ and 5 tons respectively, are made by the Rowe Motor Co., Lancaster, Pa. Body builders find a Rowe truck agency a paying proposition, as they are in touch with the truck-buying public. The sale of a Rowe chassis means the sale of one or more bodies as well.

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The Vehicle Monthly Course in Drafting and Construction

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Part E—Lesson 25. The Concentration of Diagrams

(Continued from pages 30 and 31, May, 1919, of "The Vehicle Monthly"). (For description see page 34).

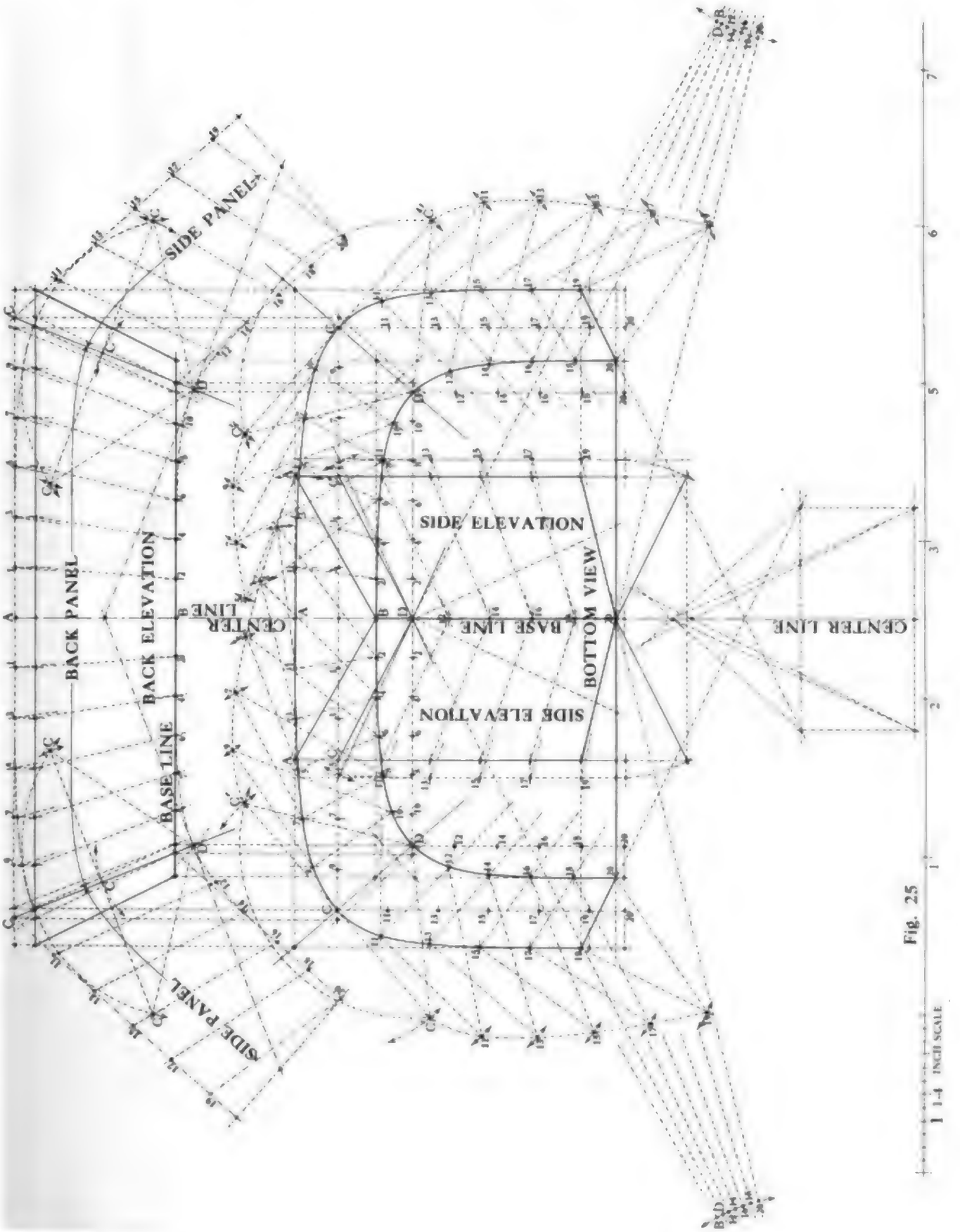


Fig. 25

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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Heergeist, Technical Editor and Draftsman of "The Vehicle Monthly."
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Subjects Treated in Previous Numbers

Part E—Lesson	1	Laying Out a Plain Board Seat	Part E—Lesson	14	One-Piece Metal Seat Panels
" — "	2	Framing a Four-Cornered Seat	" — "	15	Shape of Panel Taken Direct from Bottom View
" — "	3	Framing a Round-Cornered Seat	" — "	16	Laying Out a Square Cornered Spindle Seat
" — "	4	Laying Out and Framing a Two-Passenger Seat	" — "	17	Seats with Straight and Inclined Surfaces
" — "	5	Laying Out and Framing a Twin Seat	" — "	18	Round Cornered Seat Panel with Vertical Surfaces
" — "	6	Constructing Round Cornered Seats with Stripe and Boards	" — "	19	Obtaining Lengths, Heights and Curves by Triangulation
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" — "	8	The Laying Out of Proportional Corner Curves	" — "	21	The Creation of Bottom Curve, Length of Spindles and Position of Rails on Bottom View, by Intersections
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" — "	10	Length and Shapes of Concave-Convex Seat Strainers	" — "	22	Diagram of a Round Cornered Seat
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" — "	12	Lengths of Seat, Spindles and Position of Rails	" — "	24	Obtaining Curves of Seat Panels Direct from Bottom View
" — "	13	Panels on Inclined Square Cornered Seats			

BACK NUMBERS CAN BE HAD FROM THE PUBLISHERS.

Part E——Lesson 25

The Concentration of Diagrams

(For Working Draft see page 33.)

Explanation. Fig. 25. Diagrams of working drafts for practical purposes must be concentrated to occupy the least possible space on the draft board. One of the most important points is that one-half of seat body is always used, divided with a center line, or the outside width of the body, from which the widths are deducted; this will be explained later. Such views are constructed either vertically or horizontally, which ever is most convenient to work and take the points from, but always concentrated into the least possible space, so that the body maker can easily and conveniently reach the points from the bottom edge of the draft board. This also applies to the length of the draft board, but not as much as to its width.

On Fig. 24 the shape of the panel is drawn half its length into the bottom view, while on Fig. 25 it is drawn above. In practice all the lengthenings of the spindles as shown on bottom view are dispensed with, but must be known thoroughly for reference. They are replaced with other methods which take less space and are as correct as the methods we have explained in the past lessons. The shape of the back panel is drawn directly into the bottom view, reducing the width of the draft about 15 inches, and if the lower part of the diagram is left off as explained before, the draft can be concentrated into a width of 3 feet 6 inches, when drawn full size.

The concentration lengthwise can be accomplished by drawing the side elevation directly into the bottom view, as shown on this diagram, and the converging lines cut off at any convenient points. Thus the concentration in width and length is practical. It has always been done, and saves considerable time and labor.

To obtain the length of the spindle at the diagonal line C D, bottom view, transfer lines D C′ C′, bottom view, to D C C, back panel, and draw circular from points C C, which is the length on either side of center line on panel. Note the lengthening of the back panel shown on heavy line C D on either side of center line.

On all diagrams of the round-cornered seats, no matter how the positions of elevations and lateral views are placed; the principle of laying them out is the same, and most of the lines can be dispensed with. The diagrams can be made very simple and can be quickly done if only points are made, with most of the lines left out.

Problem. Fig. 25. Make another diagram as bottom view, Fig. 25, draw one side elevation into it, use center line for base; dispense with the lengthening of spindles entirely on bottom view and draw the full length of back panel directly into the bottom viey. Dispense also with most of the spindles on back panel, except those around the corners where it is necessary to have them. For length of spindles, and width of panel at center, at ends and on the round corners consult Lesson 27, representing the shop practice, which shows this concentration and the most practical method for obtaining lengths and shapes of turn-unders on side surfaces, including the pricking off of the rear and side surfaces of seat. This method is also employed on bodies, and can be used in practice where the body has side curve and any kind of turn-under as employed on the various kinds of seats and bodies.

PART E—LESSON 26 WILL APPEAR IN THE AUGUST NUMBER OF "THE VEHICLE MONTHLY"

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Building Bodies With "Lightning" Tools

In 1917, the Continental Car Co. of America took over the plant, land and buildings of the Continental Car & Equipment Co., at Louisville, Ky. They have thirteen acres of land, three-quarters of which are under roof, and employ approximately 250 men. They are located on the main track of the L. & N. Railroad, owning their own private switch.

Most of the machines in the wood shop, which includes band saws, rip saws, shapers, mortisers, cut-off saws, variety saws, surfacers, and tenoners, are Fay-Egan "Lightning" machines.

They are now beginning the manufacture of standard commercial truck bodies, and will begin turning out these bodies at the rate of one hundred per day and upwards.

All lumber entering into the construction of these bodies is kiln dried before being cut up, after which it is brought into the mill and cut according to pattern, and sent to the assembly, and then to the finished product.

Continental commercial truck bodies are better made bodies, as the company has made a thorough study of this business, and have strengthened the bodies where they were weak.

In addition to the manufacture of truck bodies, the Continental Car Co. also build flat, mine, dump, cane, logging and industrial cars. They have an iron shop that is modern in every way and equipped with the necessary machinery to do heavy work rapidly, and economically.

New Coal Truck Lifts Street Blockade

Residents of cities, particularly those who live in the suburbs, and who are always rushing to their employment on a limited time schedule, will be pleased to know that one of the most annoying obstructions is likely to be removed from their path. The street car blockaded by the coal wagon promises to become a nuisance abated.

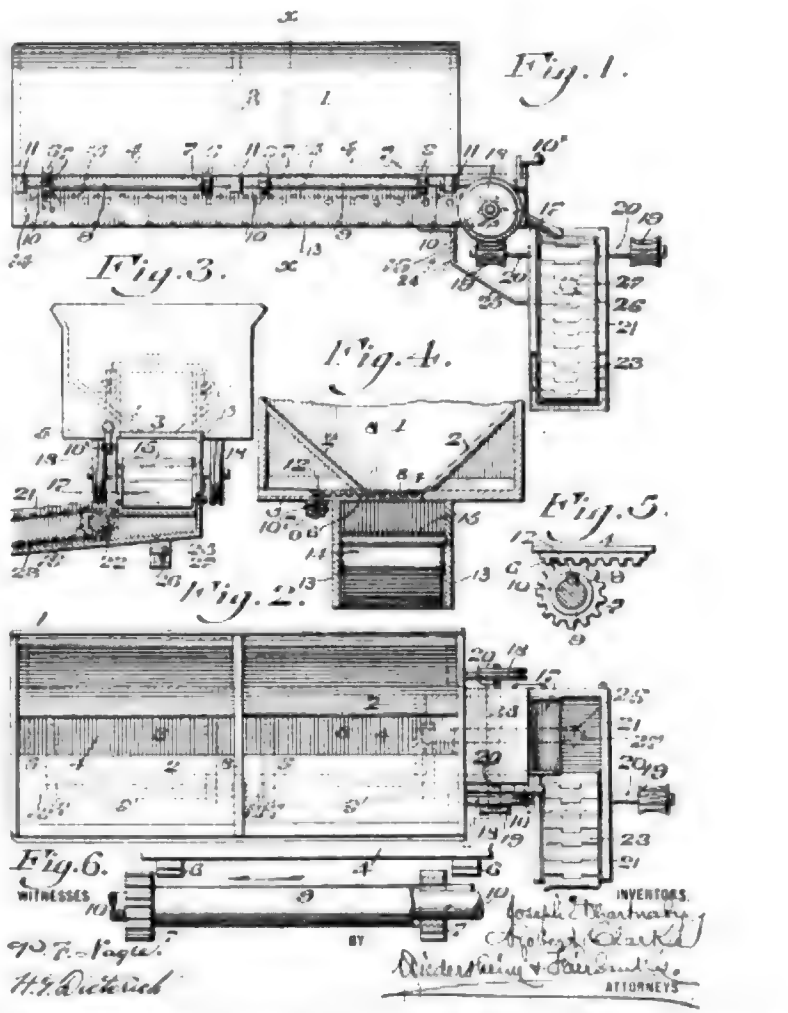
The street car is bowling along merrily in the early hours when men and women in all sorts of occupations are hurrying to work and to business when with a sudden jerk and jar the crowded car comes to a dead stop probably in the middle of the block. The passengers are often thrown in a heap by the sudden jolt, ofttimes injured, and dead silence usually ensues. Then some passenger bolder than the rest, asks in an angry tone, "Well, what's the matter now?"

The innocent conductor replies from his safe harbor in the box at the front or the rear of the car, sententiously, "coal wagon!" That explains the whole trouble.

All objections to the coal delivery system now in vogue seem to be overcome by an invention of Messrs. Whartnaby and Clarke, details of which are made clear in the reproduction of patent drawing on this page.

In this device the body of the coal wagon or truck is not elevated, and the power to move the steel conveyor belt is provided either by the truck engine or, if a horse-drawn wagon, by hand.

"The chief advantage of this invention," according to its inventors, "is that the truck doesn't block either the street or sidewalk while the coal is being delivered. People passing along the sidewalk can easily step over the chute, it being only about twelve inches above the sidewalk. The truck lies alongside the sidewalk and parallel with it, leaving the street free for traffic of both street cars and vehicles. There is absolutely no interference with travel either on the sidewalk or in the street.



Patent Drawing for a Coal Truck Designed to Lift the Street Blockade. When being unloaded the truck stands parallel to the sidewalk.

"Our modern coal truck has many other advantages," said Mr. Clark. "The conveyor works perfectly if elevated at any angle as high as forty-five degrees; in fact, we could put the coal into the second story window if needed. Not even a broom is required, for not a particle of coal or dust is dropped in delivering it. Only the services of one man, the driver, is needed. He has nothing to do but adjust the chute, turn on the power and handle the controller to regulate the flow of coal as it passes on the endless steel belt through the chute into the cellar or down the coal hole.

"The device can be used in any part of the country, for it delivers soft coal as well as anthracite. For that matter (although the inventors did not contemplate such use in the beginning) it will handle sand, gravel, lime, grain, etc., as well as coal.

"The new truck and its ingenious but simple construction is fully protected by letters patent. Several demonstrations with a finished wagon have been given before representatives of coal corporations, and all have agreed the new device is bound to come into general use."

Packard Aviation Progress

First flights are being made these days at the new Packard aviation field, located between Detroit and Mt. Clemens. Lt. Col. J. G. Vincent, vice president of Packard engineering, who became during his army service an expert pilot, is doing most of the flying. A part of the field already is in condition for use. On the remainder of it a wheat crop is growing, and it will not be disturbed till harvest. The company's experimental planes are being removed from Morrow field in Northwest Detroit, to the new grounds. Before long maps and charts for the guidance of aviators in making the field will be issued.

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Painting and Finishing

Repairing the Natural Wood Finish

By M. C. Hillick.

The vehicle painter is getting more or less refinishing of the natural wood finish to do at the present time. Some of this finish is found to be cracking and flaking off, discoloring, and otherwise going badly. When this class of finish needs doing over it is the better plan, as a rule, either to scrape the old finish off entire, which can be done if the surfaces are small, or apply paste varnish remover, which is the quicker method, and, of course, the practice to be adopted if any considerable amount of the work must be done.

In either event, after the old material has been removed, it will be the next thing in order to apply a solution of oxalic acid to the wood and allow the solution to dry on, after which wash with clean water. Then sandpaper the surface carefully and all the discolorations will be found to have disappeared. This gives the wood over to the finisher in prime condition for refilling and finishing.

Filling the Grain

The main thing, to start with, is to get the wood filled thoroughly—plumb full, as the saying is. Perhaps right here an explanation is due. The grain of the wood as you hear it carelessly referred to consists of the thready filaments running practically in all directions; pores of the wood, so often spoken of as the grain of the wood, are the spaces—the pipe lines, properly—between the filaments or grain.

These pores convey the sap of the timber; the wood may be perfectly seasoned and all moisture eliminated, but permit this wood to be exposed for any length of time to a damp or moist air, and the pores suck up the dampness to an amazing extent, and the wood soon becomes, in the language of the timber jack, "water logged." It is only when the wood is thoroughly seasoned that it may be considered fit for filling.

These pores vary in dimensions in proportion to the size or thickness of the grain or filaments of the wood; the fine grain wood is commonly known as close; where these filaments are coarse and thick the wood is known as coarse-grained. However, most all woods are sufficiently opened or coarse-grained to make the use of a paste filler necessary.

It is absolutely necessary to have the grain of the wood perfectly filled; if it is not so filled the finish is doomed to prove a disappointment; and in this case, if circumstances will permit, the shellac and varnish had best be taken off and the wood refilled.

It is plain to be seen, therefore, that the most important thing is to have the wood rightly filled; this is the base for the finish, and if the base is poor the finish must inevitably be likewise, all efforts to the contrary notwithstanding. If in doubt about this, apply a coat of varnish to a coarse-grained piece of wood and note how the varnish is absorbed and taken into the pores and grain.

A mineral paste wood filler is to be preferred to any vegetable filler; not only because it does not shrink, as the vegetable filler does, but also because it does not discolor and fade and give the wood a tonal and color effect entirely different from the original.

Before refilling the wood, or prior to filling it when new, make certain that the wood has been carefully sandpapered down and made good and fit for the filler. Clean up all water or other stains before filling, or at any rate before applying the shellac coats.

One can buy a high-grade mineral paste filler ready for use, and get it perfectly reliable and uniform in quality cheaper, all things considered, than it can be shop made. Use a filler dependable and of good quality.

Apply the filler in a plentiful volume and allow it after application to stand until the fluid content has apparently evaporated or been taken off in the atmosphere. When the pigment gets white and begins to look dry and parched, which it will do in twenty or twenty-five minutes, take a tuft of tow or white waste of a cotton fabric, and wiping across the grain of the wood, proceed to clean up the surplus filler, wiping the pigment in and off the surface.

A rotary motion of the waste or tow will serve better than almost any other manner in forcing the filler into the grain and pores of the wood. It must be understood that if the filler be wiped from the surface too quickly, or before it has dried sufficiently, it will wipe promptly off the surface without filling at all, a condition to be avoided.

In the matter of using shellac with which to build up the surface, it may be said right here that but very little shellac is today used by the vehicle painter on his wood filling.

One or two coats, generally speaking, is quite sufficient; and some painters insist that one coat will amply suffice. We believe that not less than two coats should for almost any kind of wood be employed. This shellac base will permit a quicker and a more responsive base to sandpaper upon.

Anywhere from three to five coats of rubbing varnish will be in order for a good job of natural wood finish. For a full gloss finish, after these rubbing coats have been properly rubbed and finished, rub smartly, clean up minutely, and flow a water white elastic finishing varnish over the surface. In all the above work use first-class materials and tools. They are indispensable.

Effect of Number of Coats on the Moisture Resistance of Spar Varnish

Recent experiments at the Forest Products Laboratory have provided some information concerning the relative protection against water afforded by various numbers of coats of spar varnish.

For these experiments three varnishes were selected from about forty brands tested, the first varnish being one of the best of the forty, the second a little better than the average, and the third a little below the average. From two to twelve coats of each varnish were applied to panels of yellow birch, which were then exposed 17 days to a humidity of 100 per cent. The results are given in the table at bottom of this page.

It will be noted that two coats of the first varnish were about as effective as four coats of either of the other two, and that four coats of the first varnish were about as effective as six to twelve coats of either of the others. The first varnish gave increasing moisture resistance with each additional coat, but practically nothing was gained by adding more than six coats of the others.

Comparative Reduction in Absorption of Moisture and Swelling Caused by Different Numbers of Coats of Spar Varnish Exposed for a Period of Seventeen Days in a Saturated Atmosphere.

No. of Coats of Spar Varnish	Per Cent. of Moisture Excluded (Based on Untreated Specimens)			Percentage of Increase in Width due to Absorption of Moisture		
	1st Varnish	2d Varnish	3d Varnish	1st Varnish	2d Varnish	3d Varnish
0	0.0	0.0	0.0	8.61	8.61	8.61
2	76.7	72.0	65.5	2.01	2.41	2.97
4	86.2	75.8	76.9	1.19	2.08	1.99
6	88.6	81.7	83.0	0.98	1.57	1.46
8	91.0	86.9	86.2	0.77	1.30	1.19
10	93.0	88.4	87.3	0.60	1.00	1.09
12	94.3	89.0	87.2	0.49	0.90	1.10

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Application of Pigments to the Truck

It is an exceedingly nice piece of work to lay a coat of color or paint over the far-reaching surface of the delivery van or car, and since this class of cars call for a heavier type of color or paint than the pleasure cars, the difficulty of the job increases considerably.

Many of the grays, neutral grays, etc., are largely composed of white lead, and this medium makes the pigment hard and stubborn to handle. A resourceful painter has adopted the badger hair brush for laying on these coats of heavy pigment, and he finds that it works excellently. Another painter of equal experience thinks that through thinning the pigment down somewhat below the average, it can be worked from a camel's hair tool successfully, and with his deductions we are ready to agree, inasmuch as it fairly goes without saying that any of the gray pigments when thinned a trifle below normal work quite freely under a camel's hair brush.

Of course this thinning ought not to be overdone, otherwise the results are sure to be unsatisfactory. The atoms of color when over-thinned appear to separate and the color takes on a wishy-washy look that is exceedingly unpleasant. In thinning such pigments it is a good plan to try the color several times until the consistency reaches a point that covers well without being clogged with pigment, and at the same time works freely and smoothly from the brush and flats down minus brush marks, and in drying out takes on a velvet finish.

It is important to always select and use a brush suited in size to the proportions of the surface. For a surface several feet long and the same wide, a three-inch camel's hair brush will prove a money saver and an aid to smooth and satiny finishes. It is invariably wise practice to keep the coats clean as they are applied; this saves a lot of trouble and work at the end of the processes in getting some of this drift of dirt out of the finish, for here it must be rubbed and smoothed out at the outlay of hard labor which otherwise might be saved.

It never pays to attempt to use the two-inch brush where the larger tool seems perfectly fitted, for the reason that the larger brush will enable the workman to move easier and spread the color out more uniformly and with a more exact dressing of the film.

In the case of a quick-drying or setting-up color the large brush will allow for a quicker distribution of the color and therefore a better laid coat. Brush marks need to be avoided, for they are easily exaggerated on the big surface.

Effective Painting of the Automobile

The reader may chance to inquire what is effective painting of the horseless vehicle. If so, we would say that it is, in a word, a combination of all those qualities represented in paint, color and varnish, which most completely confer upon the car beauty and usefulness.

Effective painting cannot come from any one of the things entering into the finish; it must be a combination of all the units which make up the paint and varnish fabric. It is based in the case of new work, upon the priming coat, as the first step.

Then in successive order it depends upon the second primary surfacing coat, next, upon the roughstuff coats, the puttying when necessary, then the color, color-varnish, striping, if allowed, and, lastly, the finishing varnish coat. In the placing of all these units there is the great venture embracing choice of materials, their most adroit use, the refinement of them, and the teasing into prominence of all their finest and pre-eminent merits.

In the establishment and fullest development of these traits it is the mission of the painter to make good in the largest degree within the scope of his skill and resources. He is sure, first of all, that whether new or old work is being taken in hand, that the clean-cut, honest refinement of the surface between coats, and before any coats are placed on the job—the cleaning up of the car before it is turned over for the actual painting processes, indeed—is the one thing above all others which counts most in making the finish an effective piece of work.

Workmanship, then, is one of the major factors contributing to the production of the effectively finished car; too often, apparently, it is regarded as the minor one.

This leads one naturally to inquire why this matter of highly skilled workmanship is not more often taken into account when plans are being made between the car owner and the painter for the finish to be applied to the vehicle. It may well be taken as the basis of the contract price for doing the work; it is certainly the regulator of the entire paint shop system, and by it the business must stand or fall.

As an accessory to the skilled workman must be esteemed the employment of the best class of material and tools. It is idle to suppose that skill, however highly developed, is able to accomplish great things except when aided by the employment of paints and varnishes and tools of the highest merit. Having these agencies united and working together, effective painting becomes a certainty.

Efficient Varnish Room Results

Efficiency in results from the use of varnish must begin with the first coat of rubbing varnish; too many otherwise good varnishers overlook this phase of the situation. The first and second coats of rubbing varnish appear to be regarded as merely preliminary to getting down to serious affairs on all later coats, which, as one will readily see upon observation, is an entirely wrong conclusion to reach.

The cleaning of the surface, the refinement of all the details leading up to the actual application of the material, and the flowing of the varnish, represent a branch of work none the less important than that involved in arranging for the application of the finishing varnish.

A mistake at the point of getting the first coat of rubbing varnish in place is hard to correct at a later process of work; it means extra labor and perhaps some surface disturbance of a nature sufficient to weaken the entire fabric of varnish.

To flow on the first coat of varnish the writer has always maintained, and continues to maintain, requires a highly developed measure of skill. At any rate, it should not be in any least degree neglected or passed along under the impression that whatever defect is allowed to exist in the surface with this first coat of varnish may be handily removed at the rubbing of it, or when the second coat comes along.

The best finish is obtained only when all the units of that finish have been perfected, individually, to the finest possible limit. On this basis there is no excuse nor plausible explanation to be offered in behalf of any failure creeping into this first coat.

The surface should by right carry all the varnish that the varnisher can make to flow out and stay in place. Then when this has been accomplished, with cleanliness accompanying it, the first step may be classed as a successful one. In this way it leaves the workman free to exert all his skill upon the succeeding coats.

The second coat likewise will need the same care and attention, and should get it. This helps immensely to develop the full strength of the varnish; it enables the workman to get the right finish without rubbing any considerable amount of the varnish off, which for protective purposes and for the larger development of depth and brilliancy is most important.

It will also give him the opportunity of leaving the major share of the last coat of rubbing varnish intact on the surface where it belongs, for if these coats have been properly perfected as the work goes along, the final coat of rubbing will be, in effect, a first edition of the finishing coat of varnish.

Tests for Raw Linseed Oil

Pure raw linseed oil has a bright yellowish-green color, and with age this color becomes paler and possibly a little brighter.

A test to determine the character of raw linseed oil is to take equal parts of oil and nitric acid in a white glass bottle and after shaking thoroughly stand aside for an hour. If the upper stratum is a muddy green color with the lower stratum practically colorless, the sample may be pronounced pure enough to meet all practical requirements. If the upper stratum shows a deep red brown it denotes the presence of fish oil, provided the lower stratum is a red or cherry color.

Mix and shake a quantity of oil with a solution of soda, using hot water, and if any petroleum is present it will separate from the soda solution.

Samples of oil may be exposed to a freezing mixture with the understanding that pure raw linseed oil solidifies at 17 deegres F. In the testing of turpentine use the hydrometer. If the sample registers above 31½ degrees or below 30½ degrees, reject it as unsuitable, as it surely is.

Upholstery, Toppings and Mountings

The Art of Motor Car Trimming

It has been truly said that the automobile or carriage trimmer must "quilt like an upholsterer, stitch like a harness maker, and sew like a tailor." It is just as necessary that he should have good taste and a knowledge of design, proportion and color. The materials he uses are among the most costly of those employed in the factory and require great care in storage and in working, to avoid waste. So there is a great deal for the young automobile trimmer to learn before he can consider himself an expert.

Mr. Newcomb's series of articles, now running in "The Vehicle Monthly," are intended to cover the whole subject of automobile upholstering. He has taken up the art at the beginning, and as the series proceeds will impart to his readers many useful hints and helps, as valuable to most journeymen as to the average apprentice. The series will conclude with the selection of several typical cars, for which Mr. Newcomb will furnish complete trim instruction from the start to finish.

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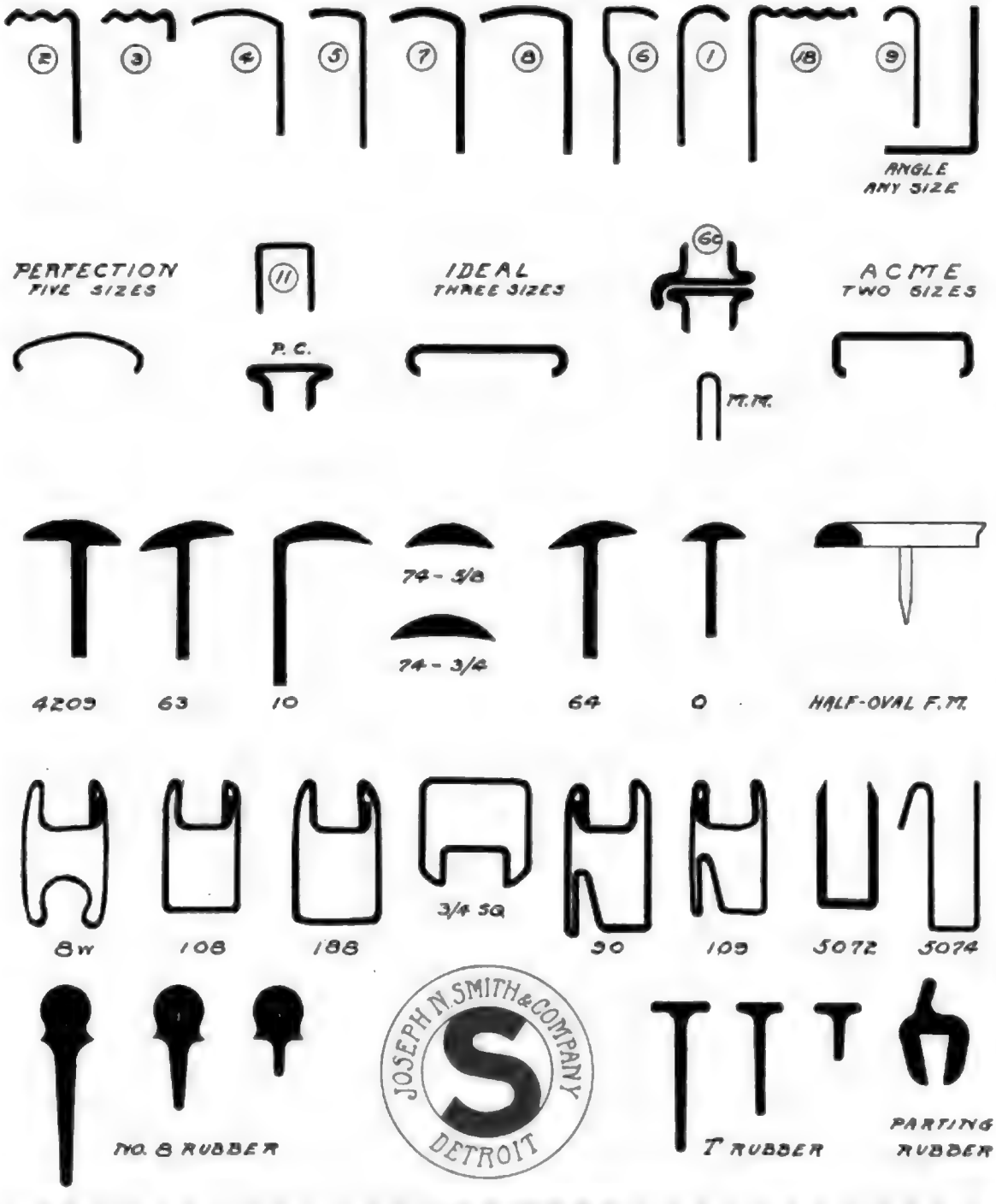
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Upholstery, Toppings, Mountings

The Upholstering of a Runabout

BY JOSEPH A. NEWCOMB

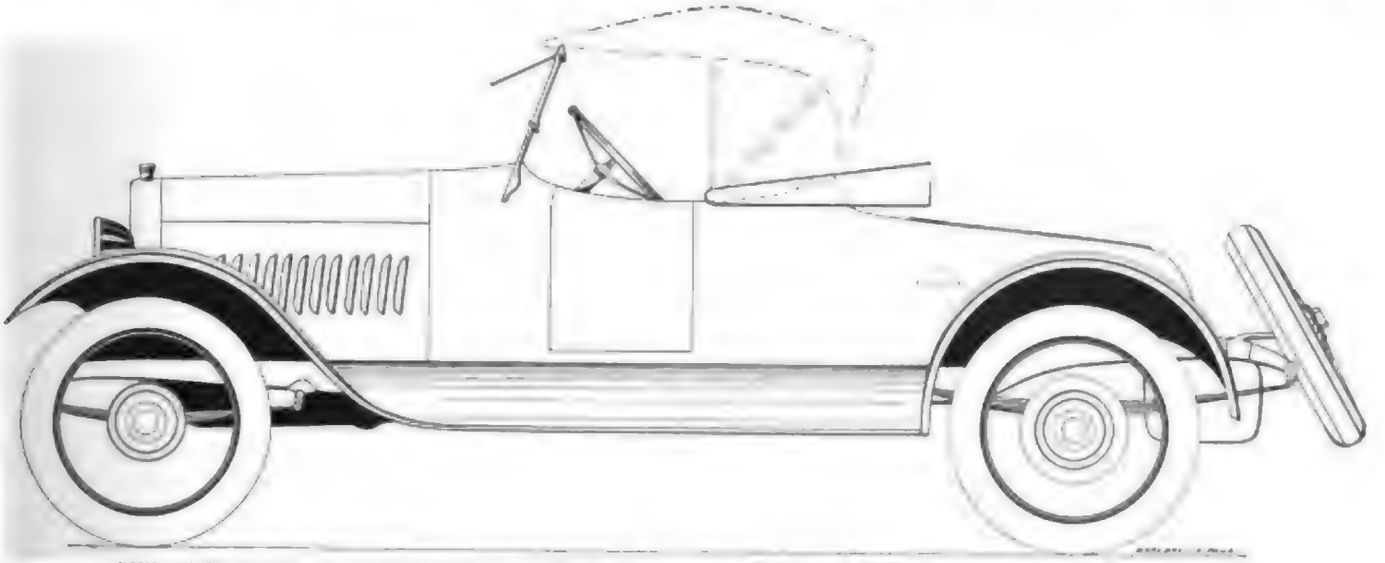
The old adage, "the quality remains long after the price is forgotten," can aptly be applied to automobile bodies. It is my purpose in this article to use as an illustration for trimming, the roadster body illustrated on page 26 of the June issue of THE VEHICLE MONTHLY, upholstering it by an up-to-date method, making an absolutely high-grade job in every detail. We shall use brown Spanish leather for the upholstering material and a high class fabric for the top.

We will upholster this body in the half diamond style and treat it as it would be done in a high grade custom shop, using a combination of hard gray hair and a soft white hair for topping.

The springs to be used are the lace web type both for the back and the cushion.

The finish around the edges is to be made with a cord and lead-filled molding covered with leather.

The body is to represent absolutely the



RUNABOUT BODY FOR WHICH THE UPHOLSTERY DESCRIBED IN THE ACCOMPANYING ARTICLE IS ADAPTED.

Attention to minor details and luxuriousness throughout must be borne in mind. Economy is to be practiced only in so far as preventing unnecessary wastage is concerned. The best of materials are to be used and the workmanship is to be accomplished in the best manner possible. The body, in other words, is to represent the highest stage of perfection of which the art of the trimmer is capable.

Quality the Main Objective

The producing of quality work requires time and patience; it is therefore costly. But when quality to the last degree is required, cost is a minor consideration. Likewise with regard to materials nothing but the best is permitted. Substitutes have their uses and prove very satisfactory, but when cost is not limited the customer insists upon the genuine article, possibly for the very reason that the cost is greater. However that may be I shall suggest the use of genuine grain leather in this body.

best that money can buy in materials and workmanship, but it is not to be spoiled by freakish ideas or gingerbread work.

In the handling of the upholstering of the concealed cushion and back in the deck, extreme care is required in order to get a "touring comfort" effect. By "touring comfort" I mean an arrangement whereby the seat is comfortable to a passenger on the road and not only on the sales floor. There is a great difference.

The space permitted for upholstering is limited by the arrangement for concealing the cushion and the back and requires quite a little ingenuity to get riding comfort. In fact, in some cases, it is almost an impossibility. As an emergency seat it can be used to good advantage, but that is about all that can be said in favor of it.

Selection of Proper Springs for Front Cushion and Back

Proper spring arrangement is the foundation for all comfortable upholstery. It is essential, therefore, that springs be given due consideration. They must be constructed to give first of all, comfort, and they must have durability. They must be of the proper height, gauge of wire and pitch. A spring made with too light a gauge wire, especially if it is high, will tremble and shift, the coils will work out of place and the whole cushion will fall.

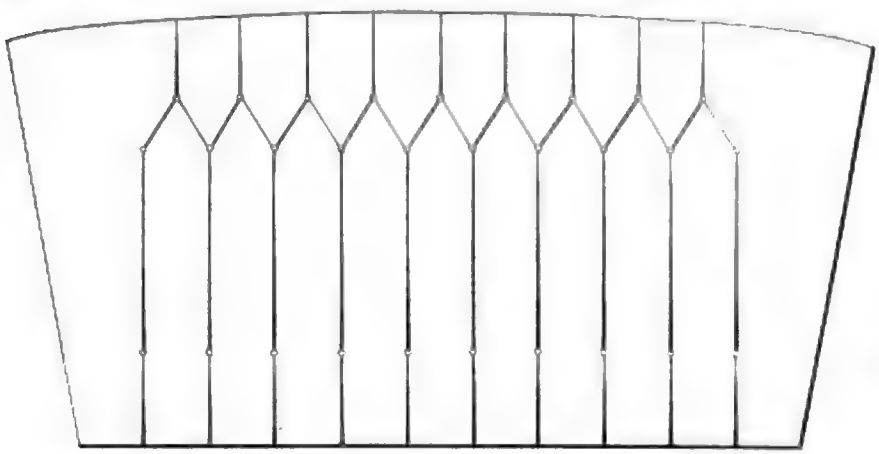
The outer row of springs, front, sides and rear, should be No. 12 wire, when an eight-inch spring is made and No. 13 for the inside coils, with a four-inch base on all springs. The coils should be "staggered," with a wire edge entirely around the cushion top and bottom and all coils woven together, with wire top and bottom. To eliminate sagging the front of spring should be anchored with a wire, running from the wire at the top front spring edge to the wire at the bottom rear edge.

The back spring construction should be made along the same lines, but in order to meet the requirements the back springs should be shaped, the shapes being determined in this manner. If a large "belly" or what is known in the trade as a "kidney roll" is required, the height of the springs should be gauged by the rake of the back if there is any rake to the frame of the body. Say, at this point, we use an eight-inch spring with the height of the springs reduced to about four inches when they reach the top.

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Over the back spring is stretched a piece of duck, which is drawn tightly to take up the slack in the spring, until the spring assumes the desired shape. We use the spring of height above mentioned or any other height desired, and the canvas covering takes up the slack.

Any gauge wire or any height back spring whatsoever would not be perfectly set without pressure. The canvas should be stitched to the spring, using a curved needle. So much for the springs on the driving seat and cushion.



PATTERN FOR BACK OF FRONT SEAT, SHOWING ENLARGEMENT FOR FULLNESS

The Rear Cushion and Back

The rear cushion spring construction is that of the pillow spring type, attached to cardboard or buckram of a height that will permit of folding. The top of the springs is tied much the same as is done in furniture work. Around the edge a hard roll is made, using cotton for a filling, which is stitched with sewing twine to assure a permanent foundation for an edge. Canvas is stretched over the springs, and tacked around the edge of the seat framing. Hair is piled to the desired height, over which muslin is stretched and tacked to the outer edges. Over this foundation is fitted the outer covering.

The rear back foundation is built with the use of pillow springs attached to buckram, over which is drawn a piece of duck to give the springs the proper shape. The outer covering pad goes over the duck.

Making Foundation Patterns for Tufted Work

Systems for fitting patterns for foundations vary, in keeping with the experience of the trimmer and the requirements of the firm that employs him. Our experience furnishes this method for making foundation patterns for a car of this type. After the springs are placed in position we tack the foundation on the seat board, drawing up tightly and smoothly tacking temporarily at the top rail. Mark off at the seat board, at the trimming stick, at the top where finish is required, and at the side quarter mark, where outer line of plait is to finish. Then take the pattern from the job; lay on the bench; square up the outer lines; find the center and space off with the compass to get the desired width of the plaits. If we allow the bottom line of buttons to set a couple of inches above the top of the finished cushion we can arrange the top line of tufts to be set in proportion to the width of the plait, which should be at least one inch greater. The line of tufts below that forming the diamond point should not be less than three inches, nor greater than the width of the plaits across the back. Fullness is not required between the points of the diamonds and the lower line of tufts for the reason that the setting of the springs has provided for the shape of the back. But there should be a fullness between the two upper lines of tufts to take out the "draw." Three-eighths is usually sufficient while three-quarters to one inch is sufficient across the plait.

Fitting the Quarters

The fitting of the quarters is done before fitting the back. The quarters require no springs. The foundation material is stretched over the entire space representing the quarter, and is marked along the seat board at the tacking strip, the door pillar at the front, along the back strainer line, and at the top edge. While the material is tacked in as a pattern, mark for the last plait line and make provision so that this last plait line will extend far enough front to allow its showing when the back is hung.

Then take the pattern from the job and space off, making allowance for the first plait line back of the door pillar to be one inch wider than the inner plait lines. We must allow the outer plait to be larger, for the reason that if it should be the same as the other plaits, when hung it would appear smaller and out of proportion.

In laying off for the cushion it is imperative that the plaits line perfectly with the back. This is easy to accomplish if the foundation pattern measurements are followed. That is to say, if the outer line of plaits measures 35 inches on the pattern, the plaits when drawn over the cushion should measure the same. Likewise the same method should be followed when hanging the back. This will insure symmetrical lines without first fitting the cushion in the job to see whether it lines up with the back. This being tufted work, operating correctly is essential; that is to say, the operator must follow the exact line as marked out on the leather. About one-eighth inch should be sewed in, and where the buttons are to be placed a stitch should be skipped on each side of the hole punched for the button, thus allowing the button to sink in and to get the full benefit of the amount of fullness and also eliminate drawing.

The pattern as marked out for foundation is then laid over a covered frame and the exact lines, as designated, marked thereon. The hair is piled on lightly to a sufficient height to properly take up the fullness provided in the leather.

Tufting with Buttons and Cord

The leather is drawn over the hair and basted in place by the use of upholsterer's pins. This is done to keep the hair from shifting. The buttons are drawn through the leather, hair and foundation, using the best grade of linen tufting twine. A very good grade of tufting twine is essential to prevent as far as possible the buttons breaking loose. The buttons are tied down over a cord at the back of the foundation, using a slip knot. After the tufts are drawn down almost to their permanent place, the leather plaits are regulated. The stuffing rod is used to loosen the hair and fill up the hollow spots, then the tufts are "drawn home" and tied fast. This method is used on the backs and quarters.

Building the Cushion

The spring used is the lace web type. In fitting the cushion top the duck is drawn over the entire spring except the bottom. Mark around the top spring line and the bottom of the wood frame, allowing an inch for tacking at the bottom and laying out for the top after the pattern is removed from the spring. We should work from the centre, arriving at the objective lines of from three to three and one-half inches from the line indicating the spring edge.

Space off from the centre to the outer objective lines, to ascertain the width of the diamonds required. Then space off across the cushion, which is the width, but the length of the diamond should be greater than the width. In laying out for the "diamond and a half" the width is laid out in thirds, or in other words, the space from the front lay-out line to the back lay-out line should be in three equal parts. Therefore when drawing the lines diagonally across the cushion the "diamond and a half" lay-out is arrived at. Refer to drawing for correct lay-out

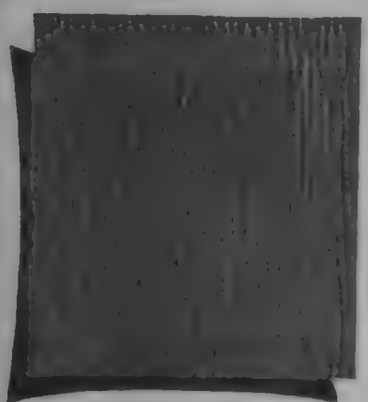
This cushion is intended for a facing and we add to our outer line three-eighths inch for the sewing of the cord and facing around the top. This completes the lay-out for the foundation pattern.

The fullness pattern from which the leather is cut is derived from the foundation

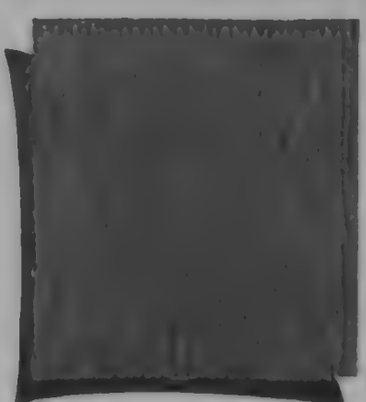
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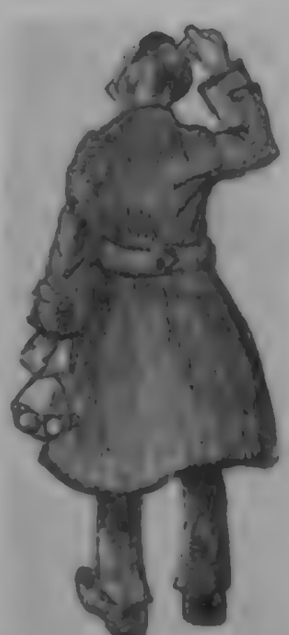
Which is Which ?



SO far as appearance goes, there is absolutely no difference between Coated Leather Splits and O'Bannon Moleskin Leather.

We reproduce the finest grains just as the maker of split skins does. We impress them upon coatings found to be as durable and, in many cases, even more satisfactory than are used on best splits.

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But **O'Bannon Moleskin is Superior** in its backing. Made of a tough, strongly woven, cotton fabric, it cannot deteriorate, cannot become hard or brittle. It wears as long as the coating, never rotting or crumbling like the under side of leather splits.

O'Bannon Moleskin is thus the logical upholstering for the quality car. We can furnish it to match all the latest modes in finishing.

Samples? Certainly.

Artful Applications of O'Bannon Products on next two pages.

O'BANNON FABRICS

O'BANNON COATED FABRICS

ARTFUL APPLICATIONS

Are You Getting What You Pay For?

Just a word of caution to the trimmer regarding top building and the proper use of materials. The upholstering or trimming department of an automobile body shop requires a considerable outlay of money for materials.

Considered from all angles the purchases must be made with the ultimate idea of satisfying the owner of the car.

The selection of these materials is usually made by men of long experience, who endeavor to get value for money expended.

You men at the head of the trimming department can help them if you will. For instance, you are being furnished with 54-inch or 60-inch top goods. You should invariably measure such goods. Are they full cutting widths as called for? An inch shy in widths may add considerably to your costs. O'Bannon coated fabrics always measure full cutting widths as specified. It's a big item and worth watching.

O'Bannon Goods Are Always Uniform

Uniformity of color, lustre and grain in an upholstering or top material, so that roll after roll can be cut and matched up, means a big item. Only large, efficient producers with up-to-date facilities can do this. The O'Bannon Corporation guarantees these features in all their coated fabrics. In the course of a season's production this will figure largely in your costs Watch that your materials don't crack or peel when turned over and sewed close to the turned edge. O'Bannon goods will not crack nor peel.

Buy Quality if Service is Expected

Would you put a paper roof on your house and expect to get service out of it?

Can you expect to get service out of an automobile top unless you are able to discriminate?

First, last and always buy the best you can afford but don't let price be your guide in buying. Remember the slogan—"BUY QUALITY, NOT QUANTITY."

An Attractive Top Helps to Sell the Car

An automobile top represents quite an item in the cost of a body and unless it is all it is supposed to be it is a big detriment to the sale of the car and increases the depreciation thereof quicker than any other part.

An attractive well made top helps wonderfully in the sale of any car—and a top made of Duxrane, which keeps its shape does not sag, nor crack, nor peel, nor leak—makes satisfied customers. Satisfied customers and users are your best assets.

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OF O'BANNON PRODUCTS

O'BANNON COATED FABRICS

Give it the Scrub Test

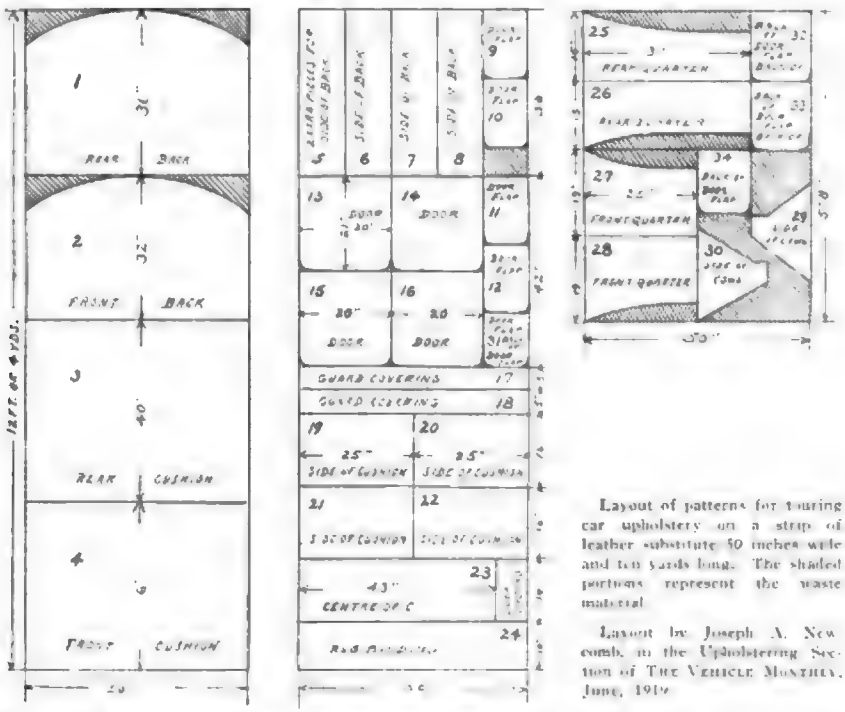
An automobile top is made purposely to fold and in such position it gets its hardest and most severe test due to the rubbing and wear from the vibration of the Car. DUXRANE will stand this rubbing and wear longer than any other top material made, as is evidenced by the fact that it will stand up under the extreme **SCRUB TEST.**

Being a single texture top fabric there is no possibility of its blistering or separating, yet it is extremely tough. Tack it in place and it will stay there without sagging, insuring at all times a trim, taut Top.

If there is a question in your mind regarding the quality of DUXRANE write the O'Bannon Corporation for a sample and give it the extreme scrub test:

Take a piece of Duxrane Top Material in your hand and treat it rough. Scrub it together back and forth unmercifully, precisely as a washerwoman scrubs clothes. Do it again and again (say 35 times) and then examine the result closely—you will find absolutely no mark or crack in the material and not even as much as a mar in the finish of its surface. This is the test devised by experts who buy Rubberized Top Fabrics in large quantities. It is far more severe than any to which the material could possibly be subjected to in actual use or service.

If you do this we know you will always specify DUXRANE. You can purchase it direct or from your dealer.



Layout of patterns for touring car upholstery on a strip of leather substitute 50 inches wide and ten yards long. The shaded portions represent the waste material.

Layout by Joseph A. Newcomb, in the Upholstering Section of THE VEHICLE MONTHLY, June, 1919.

O'Bannon Corporation is equipped to quote you on your requirements of Leather Substitutes, Rubberized Top Fabrics and Enameled Goods. Write for our complete line of samples

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REG. U.S. PAT. OFF.

SINGLE-TEXTURE TOP-FABRIC

GIVE it the *Scrub Test.* Take a piece of Duxrane in your hand and treat it rough. Scrub it together unmercifully, precisely as a washwoman scrubs clothes. Don't be afraid of injuring the surface, because you can't. Rub it hard, so hard that the surface will become hot, then try to peel off the coating. You will find that it adheres so tenaciously to the fabric that it cannot be peeled. This is the test devised by experts who buy rubberized top fabrics. It is far more severe than any test to which the material could possibly be subjected to in actual use or service. Isn't there a sense of satisfaction to you as a Trimmer to know that the tops you put out will stand up under the most severe use and service and retain a new, snappy appearance? Let us send you a sample of Duxrane to test as we have suggested. Seeing is believing and a test is the final proof of superiority.



O'BANNON FABRICS

O'BANNON CORPORATION

200 FIFTH AVENUE : NEW YORK



Funeral Car, With Body Built by South Bend Spring Wagon and Carriage Co., South Bend, Ind.



Funeral Car, With Body Built by Rock Falls Manufacturing Co., Sterling, Ill.



Ambulance Body on Packard Chassis. Body Built by A. J. Monday Co., Milwaukee, Wis.

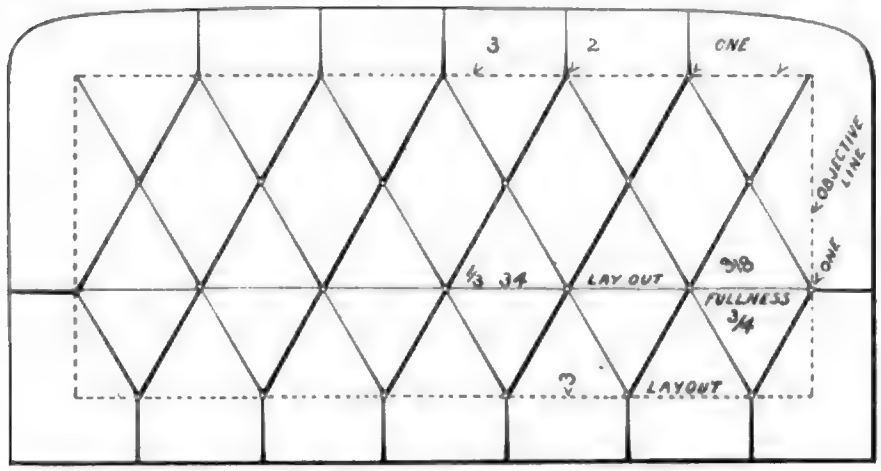
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Upholstering a Runabout

(Continued from page 42)

pattern as a basis. A fullness pattern means simply the enlarging of the foundation pattern by the amount of the fullness required, from three-quarters of an inch to one inch across the diamond and less in proportion as related to the length of the diamond. Always less fullness is required the length of the diamond than across the diamond, which has been explained in previous articles in THE VEHICLE MONTHLY when treating of tufted work.

The cushion top is made on a frame the same as the back, sewed around the outer edges by hand and the facing sewed in position. The facing pattern is obtained by fitting the goods around the sides of the springs to get the desired shape. Then when the cord is sewed on the cushion it is fitted around the top as sewed on the frame, in order to get the exact size of the top, and is joined together at the back. The facing and cord is attached to the top while on the frame by back stitching. Back stitching insures smoothness.



CORRECT LAYOUT FOR DIAMOND AND HALF-DIAMOND DESIGN.

The top being completed it is cut from the frame and stretched over the spring. It is well to lash the top to the spring edge by means of whip stitching with a curved needle. This avoids the shifting of the top. The facing is then drawn down over the spring and tacked to the wood frame at the bottom, covering the bottom with enamel duck and making provision for ventilation.

Fitting the Rear Back

The rear back is fitted over the spring, but care must be taken that the thickness of the back is not too great, otherwise folding of the seat would be prevented. The back is finished on the inside of the wood frame. The inside of the body in the rear is lined entirely with carpet, that is, on the floor, the sides and front. We specify carpet, because carpet gives a more luxurious finish than linoleum or similar material.

The Door Trimming

In the doors, ample space is provided for pockets. The doors are lined with a brown Spanish leather substitute. Buckram is fitted for a foundation, over which the leather is cemented, sufficient opening being provided, which is covered with a flap. The flap should be at least two inches larger than the opening, cemented on buckram, lined, hemmed and attached to the body part of the door trimming with patent fasteners. The finish around the doors and around the backs or other places where finish is required, is made with a lead-filled molding covered with brown Spanish leather.

Treatment of the Cowl

The cowl on this type of car is not trimmed; only the wood work representing the cowl facing is covered. The rest of the interior is painted with a light colored paint. Door checks are made from non-stretching webbing, using footman loops for the ends and covering with leather.

Suggestions for the Top Construction

The top should be built in keeping with the rest of the job. The quarters and back stays should be made in one piece. The back lights should be the beveled plate glass, metal edge type, shape to be selected in keeping with the lines of the body. All outer edges of the quarters and back curtain should be bound with brown Spanish leather. The finish over the front and back bow should be made with a cord, a leather-covered molding joining it. The back curtain and stays are attached to the body by means of patent fasteners. The construction of the body permits of a low, racy type top, yet permitting of sufficient head room. A dust boot is provided, and the sleeve should be reinforced and stiffened, in order that when top is thrown a neat appearance is the result.

Hood Covers

We are getting "fussy" even about the hood covers for our cars. We used to be satisfied with an ordinary blanket or lap robe, thrown over the hood, when the machine was "docked" at the curb for a few minutes or a few hours.

Now, however, the fastidious car owner demands a hood cover that harmonizes in color with the color of his car; he wants a material that will not fade; a non-porous article that prevents the cold air from reaching the metal of the auto hood and keeps the engine warm; a water-proof material that is also mud, dirt and grease-proof.

As usual, science has met the demand. There is offered on the market a material having a cotton fabric base and a pyroxylin coating. It may be had in almost any color, it fades not; it is about as porous as a rubber bag and as water-proof as the Newfoundland fisherman's slicker. It is not mud, dirt and grease-proof exactly, but, being water-proof, it is washable and all dirt and grease can be washed off as readily as butter can be washed off a china plate.

Trim Shop Brevities

Proper facilities for cutting is an added attraction. Cutting benches for top work should be as long as possible and no wider than the goods required to be cut on that table. Racks are provided to carry several rolls of top goods. Low cutting tables for leather of sufficient size for a large hide are made of end wood much the same as a butcher's block, which permits using punches without damage to the table or the punches.

* * *

Good shop equipment (facilities, comfort and light), usually causes satisfied and contented workmen. Work benches too high or too low are a serious mistake and a hardship on the workmen. The average height of a work bench for an automobile trimmer is 37 inches.

* * *

Sewing machines adapted to the use for which they are required are essential. It is a tough job for a trimmer to work in a shop where foot power machines are used and the floor used for a cutting table.

* * *

Study the materials you are using; it will be beneficial to you.

Meyer Threads in the Trim Shop

Meyer threads are probably the best known good of their kind that enter into the upholstery of a car. Besides being almost universally used in carriage and automobile upholstery departments, they are widely employed by the leading houses in the boot, shoe, saddlery and harness trades.

Meyer threads can be had in any size or color desired for hand as well as machine stitching. The Meyer threads have been in the market for the last fifty years and have a world-wide reputation. The Meyer "Never-Rip Tufting Twine" is second to none, and buttons sewed on by this thread are claimed never to come off. Send for prices and samples to the John C. Meyer Thread Works, Lowell, Mass., and they will be cheerfully furnished.

The Auto Wheel Co., Lansing, Mich., is now operating full blast and is approaching capacity. The company is producing 450 sets of wheels daily and is taking on more men.

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News in the Trade

Bossert Corporation Helped Soldiers Cross the Sea

It is now permitted to tell about some of the devices that helped to fool the Huns. One of these devices was made in large quantities at the plant of the Bossert Corporation, Utica, N. Y., but under such conditions that not even the men who worked in the company's plant were able to know fully the great part they were playing in making possible the transportation of American soldiers overseas.

The "Otter" or Paravene

At the beginning of the war so many ships were sunk by coming in contact with moored mines that Commander Burney of the British admiralty devised a method of making every vessel its own mine sweeper. After repeated experiments this device, called after its inventor, Burney Gear or Otter, was adopted by the admiralty and manufacture was speeded up to its fullest extent and it was found that a vessel could sail through fields of German sowed mines. When America entered the war a manufacturer was sought to build this device for the United States. The Bossert Corporation came forward in a most patriotic way and canceled much of their commercial work to take up this work which required a large force and special machinery of which this factory was equipped.

The purpose of the paravene was to protect vessels against moored mines. A "Q" type of the same device was used against the submarines—this was an explosive mechanism and was in operation extensively in the early days of the war.

The paravene is nothing more than a cylindrical metal body, about 12 feet in length, weighing 1,425 pounds. It is fitted with a rudder that kept the machine at the proper depth while running. One paravene was towed on each side of a vessel by a steel cable from a point as low as possible on the stem of the ship. As each paravene was kept away from the ship's side by a plane set at an angle to the body, it can be readily seen that a V-shaped wedge would be formed by the two towing cables with the bow of the boat as the apex.

An Efficient Mine Destroyer

Should a mine mooring be encountered by either of the two cables it would automatically slide along the cable until it came in contact with the paravene.

The essence of the whole story lies in the fact that each paravene was fitted with a set of fixed teeth which grasped the mine mooring with such force that it was cut as easily as a knife cuts a piece of cheese. The mine, thus released from its anchorage, would come to the surface and was destroyed. The towing cable of each paravene was about 56 yards long, so ample sway was provided for catching a mine.

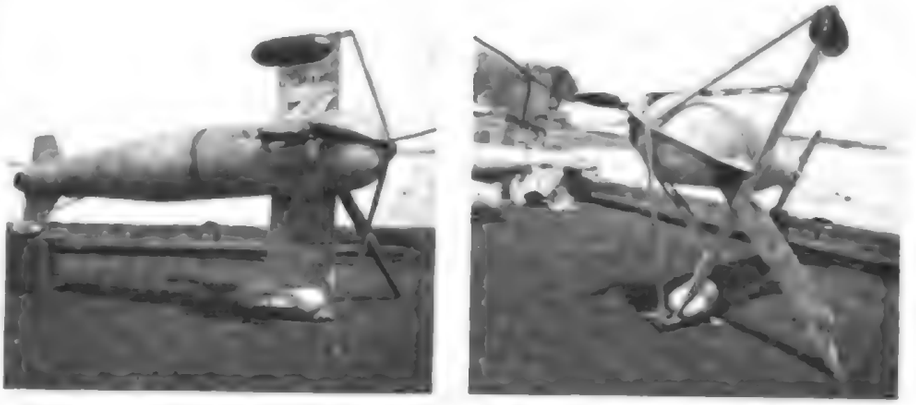
If a ship should hit a mine bow on, the result might be disastrous, but results show that such possibility is almost negligible. Even if it did happen, the paravene was by no means inefficient. The Germans equipped their mines with a device that was intended to deal more than ordinary destruction to allied ships. This consisted of a hang-fire mechanism that times the explosion to take place several seconds after the impact, so that the mine would be nearer a more vital part of the vessel than the bow. This scheme proved an aid to the paravene, since the few seconds delay gave the mine just time enough to slide along the towing cable to a point where the explosion would be virtually harmless.

Except in a heavy sea, when the ship was pitching badly, there was no chance of a mine being missed by the towing cables and hitting the vessel's bottom. In fact, the protection offered by the paravenes was so perfect and the result of their use so pronounced in more than two years of service with the general fleet, that the American navy, as soon as the United States declared war, adopted the British invention as regular equipment for its own ships.

Back to Peace-time Production

The Bossert Corporation, with its 175,000 square feet of floor space and its wonderful equipment of steel-working machinery, is now back on a peace time production basis. In the Bossert factories are some of the largest presses in the world, with numerous smaller ones, and its furnace equipment is probably not duplicated in the automotive parts industry. In this factory about two hundred separate parts for automobiles, trucks and tractors are made, all standard and all adaptable in automobile, truck and tractor design where weight-saving is a factor to be considered.

Manufacturers in all the automotive industries are invited to make use of the Bossert engineering department, and correspondence is solicited relating to any pressed steel parts needed.



Side and front views of the famous paravene or "otter," made during the war by the Bossert Corporation, Utica, N. Y. With this device every vessel was its own mine sweeper.

Peters & Herron Reorganization

The Peters & Herron Dash Co., Columbus, Ohio, has been reorganized and is to be known in the future as The Peters & Herron Co. The new company is a consolidation of The Peters & Herron Dash Co., The Ohio Carriage Manufacturing Co. and The Nu Back Fur Co., all of Columbus, Ohio. The Peters & Herron Co. have acquired the real estate and factory buildings of The Ohio Carriage Manufacturing Co., or rather that part that has been used for the manufacture of horse-drawn vehicles.

The company will manufacture automobile accessories, such as radiator and hood covers, and tire covers, as formerly made by The Peters & Herron Dash Co.; in addition to these lines they will also manufacture a special patented fabric formerly known as "Nu Back Fur", which is a fabric used largely by the United States Government in the lining of aviation suits.

The new company has a capitalization of $400,000 and is officered as follows: Charles M. Peters, president; H. C. Phelps, vice-president and treasurer; M. K McGaughy, secretary and general manager.

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Outing of Cincinnati Vehicle Builders' Club

The annual outing of the Cincinnati Carriage Makers' Club took place on Saturday, June 14th. This long-looked-for event is always regarded as one of the most pleasant of entertainments and the day is celebrated with frivolity, song and diversified amusements.

It was 10.15 in the morning when the steamboat "Kentucky" left her wharf for New Richmond, Ohio, which spot, by the way, is one of the oldest and quaintest little towns in the State, situated about twenty-two miles up the river. This year's outing marked the twenty-fourth annual outing of the Cincinnati Carriage Makers' Club. The weather was ideal.

P. P. Hunter, chairman of the entertainment committee, worked for the enjoyment of the party, and to him much credit is due. He was ably assisted by the following gentlemen who comprise the entertainment committee: I. O. Bauer, Howard Cox, P. J. Zimpelmann and W. F. O'Brien.

The dinner was a most substantial one and was served in the cabin of the boat. Mr. Hickmann, the steward for the occasion, was highly commended for his efficient service in taking care of the one hundred members and fifty guests.

A superb jazz band, with singers, lent their share towards the amusement of the party. New Richmond was reached at two o'clock and the majority strolled to the ball field, where a game of ball was scheduled by teams managed by Milt Wieman, of the Brown Carriage Co., and A. C. Pogue, of Mossman Yarnelle Co. This game of ball was indeed a feature of the outing and elicited a great deal of applause. Mr. Wieman's team won the game by a score of eight to one.

At 5.15 the "Kentucky" headed down the river for Cincinnati, with the band playing and all in good humor. At 6.15 a most delightful buffet lunch was served and relished by all. There was abundance of eats and drinks and the day long will be remembered by those who were fortunate enough to attend this picnic.

One of the most pleasant features of the occasion developed because of the various carriage manufacturers of the country who came to Cincinnati to attend a meeting at the Hotel Gibson on the 13th inst., deciding to remain in Cincinnati and attend the outing.

Notes of the Outing

Gale Smith, of the Geo. Delker Co., Henderson, Ky., was present.

* * *

Fred Luth came up from his home in West Virginia to attend the party.

* * *

C. B. Vandervort, one of the past treasurers of the club, was in evidence.

* * *

"Tony" Theis, of the Ed. F. Alf Co., came in from the road and took in the fun.

Tom Price came over from St. Louis for a little recreation as a guest of P. E. Ehrenz.

* * *

Joseph Wallenstein, secretary of the club, also was on hand early to greet members and guests.

* * *

Theo. Luth, one of the hard workers of the club, always has a splendid time at the outings.

* * *

Geo. S. Weimer, of the F. A. Neider Co., ran up from Augusta, Ky., and so did Isaac Reynolds.

* * *

H. H. Nelson was on hand early at the wharf and looked after the welfare of each and every one.

* * *

Major Bert L. Baldwin, who served in the engineers' corps "over there", was an invited guest of the club.

* * *

Hanly Bohon and Austin Levan, of the D. T. Bohon Co., Harrodsburg, Ky., made the trip and enjoyed every moment.

* * *

E. E. Hess, the club's treasurer, was out of the city, but he sent a very able representative in the person of his son Ralph.

* * *

Clen Perrine, president of the club, was indeed a very happy man. He forgot business for the day and enjoyed every second.

* * *

O. B. Bannister, of the Muncie Wheel Co., Muncie, Ind., never missed an outing and a chance to mingle with his Cincinnati friends.

* * *

Judge Fred L. Hoffman, of the Common Pleas bench, and Judge Bernard C. Fox, of the Municipal bench, kept everybody on their good behavior.

* * *

A. S. Brown, of the Summit Thread Co., one of the past secretaries of the club, and an ardent worker in its interest, was missed from the party.

* * *

Roy Matthews, of the Ohio Carriage Mfg. Co., Columbus, and Louis Auger, of the Brewer-Tichener Corporation, were guests of Otto Heinrichsdorf.

* * *

A. H. Ahlbrand, president of the C. B. N. A., and also a member of the Carriage Makers' Club, came up from Seymour, Ind., and enjoyed the day.

* * *

P. E. Ehrenz, of St. Louis, chairman of the executive committee of the C. B. N. A., and also a member of the Cincinnati Carriage Makers' Club, came over for the frolic.

* * *

W. J. R. Alexander, another past secretary of the club, who is in South America on business, was greatly missed. He is representing the Beckwith-Chandler Co. in the Southern continent.

The 1919 C. B. N. A. Convention

MOUNT VERNON, N. Y., June 1, 1919

To the Members of the Carriage Builders' National Association:

The Forty-Seventh Convention and Exhibition of the Carriage Builders' National Association will be held in Chicago, Ill., from September 22nd to 26th, 1919.

The Exhibition from September 22nd to 26th inclusive. The Convention—September 23rd, 24th and 25th.

Both the Exhibition and Convention will be held in the Hotel La Salle, Chicago.

The Committee expects to arrange for the meetings in such a manner and with such subjects that the whole carriage trade will be both instructed and benefited. We expect this to be one of the very best of our Conventions.

You are earnestly requested to arrange to be present; you will surely be repaid for your time and expense.

By order of the Executive Committee.

HENRY C. McLEAR, *Secretary.*

Federal Trade Commission Investigates Pan Motor Co.

Its first formal complaint in the government's effort to eliminate misrepresentations and unfair practices in the interstate sale of stocks and securities, was issued by the Federal Trade Commission June 6th, against the Pan Motor Company, St. Cloud, Minn., and its president, Samuel C. Pandolfo.

The complaint states that the Commission has reason to believe the concern, which, the Commission alleges, had taken in $4,723,811.69 from the sale of stock from its incorporation in January, 1917, to February 28, 1919, and its president, has, with the effect of deceiving the public, circulated throughout the country false, misleading and unfair advertisements, statements and the like concerning the assets, resources, progress, business good-will and financial standing of the company; and has suppressed and concealed from the public facts relating to the concern.

The Commission alleges that in March, 1919, there were 54,000 recorded subscribers of Pan Motor stock in the United States and abroad, of whom 39,000 had fully paid their subscriptions. The complaint also sets forth that up to September, 1918, $1,156,667.53 had been paid out as commissions to salesmen and agents for the sale of stock; and that $553,752.38 had been paid to Samuel C. Pandolfo as commissions for alleged services.

Despite the fact that the Pan Motor Company represented that it planned to "manufacture" passenger automobiles on a large scale, merely some 200 cars had been assembled by the company, the complaint alleges.

The company and its president were further charged with circulating false, unfair, unfounded and misleading statements, charges, criticisms and comments regarding the jurisdiction, authority, investigations, reports, findings and personnel of various state, municipal and governmental departments, commissions, committees and agencies. The concern and its president were cited to make answer before the Commission July 10th.

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Business Outlook in Cincinnati

Cincinnati is enjoying a very good carriage business and the factories are humming with business with all the work they can do. The trade never seemed brighter and prospects for continued and increased activities never were better.

The material situation is on the advance and prices are firm. From all indications this will continue right along. Some material is hard to obtain. Leather and cotton goods of all kinds have advanced decidedly, while iron and steel are holding their own. An advance along these lines would not be surprising.

Quite a few of the factories have contracted for their materials, but those who waited for a decline will be disappointed. It seems the dealers in carriages and buggies are well posted on the markets and are now ordering liberally.

Cincinnati News Notes

The Brown Carriage Co. tendered their employes an outing at the Cincinnati Zoological Gardens on Saturday, June 7th.

* * *

Messrs. Oppliger and McNamara, of the Phoenix Carriage Co., were out of the city during the month visiting their trade.

* * *

Clen Perrine, of the Brown Carriage Co., has been out of the city in the interests of his firm and reports business as being good.

* * *

Luth Carriage Co. are having a very nice trade and are decidedly busy.

* * *

Jos. Wallenstein, manufacturers' agent, has removed his office to 904 Commercial Tribune Building, where he will be pleased to see his many friends.

Canadian Motor Car Industry Expanding

Important extensions to the Canadian motor car industry are being made. A part of the building program of General Motors of Canada, Limited, has been announced by the president, R. S. McLaughlin, of Oshawa.

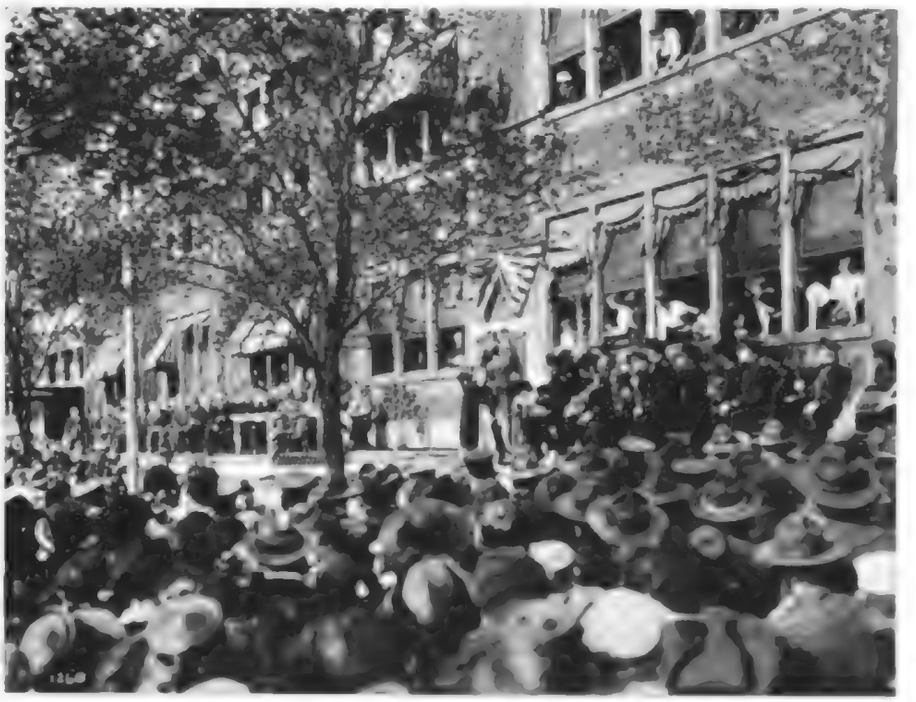
At Walkerville a large plant is now being erected where motors, transmissions and all heavy parts of motor cars will be made, to be assembled at various other plants of the General Motors Company. At Oshawa a large plant will be erected for the assembling of Oldsmobiles. Two other large buildings will be erected for other purposes.

The entire Canadian program will mean the expenditure of considerable more than $6,000,000. The Oldsmobile plant will be in operation before the end of the present season.

The Liberty Motor Car Co. will build a new factory in the district adjacent to the Hudson Motor Car Co., the Continental Motors Co., Wadsworth Mfg. Co., Maxwell-Chalmers and other automotive plants in Detroit. With the new factory the company hopes to double production.

Pierce-Arrow War Memorial

The entire body of workers at the plant of the Pierce-Arrow Motor Car Company of Buffalo, N. Y., staged a most impressive Memorial Day tribute to the 2,200 factory men who served in the war. Massing by the thousands in front of the plant, they unveiled a big bronze tablet sunk permanently into the front wall of the administrative building. The allegory expressed in bronze shows a skilled automobile worker laying down his tools to accept the sword of justice from the Spirit of Liberty.



Unveiling of the Soldiers' Memorial Tablet, built into the walls of the Pierce-Arrow Motor Car Co.'s factory at Buffalo, N. Y.

About 900 men who have returned from service to their positions in the shops donned their uniforms for the occasion and marched in battalion form to the scene of the unveiling. The big Pierce-Arrow band furnished music.

A special section was reserved for mothers and wives of the 32 Pierce-Arrow men who lost their lives in service.

The tablet was erected by the employes, who freely subscribed to a fund to cover its cost. It was designed by Major Herbert M. Dawley, himself a Pierce-Arrow man, having been the company's art department manager for several years before responding to the call to colors.

Employment Information for Ex-Service Men

In furtherance of its campaign for obtaining employment for discharged soldiers and sailors, the War Department has organized a Special Information Bureau to which ex-service men may apply directly for information on any point in which they are interested.

This Information Bureau is under the direction of Colonel Arthur Woods, Assistant to the Secretary of War. Its function is to provide an agency to which ex-service men may apply directly on questions concerning allotments, War Risk insurance, bonuses, employment, civil rights, vocational training and the like.

The inquiries on these subjects, directed to Colonel Arthur Woods, War Department, Washington, are forwarded to the proper Bureau, where every effort is made to obtain prompt attention for them.

Standard Parts Company Official in Europe

Additional evidence of Cleveland's expanding business in foreign markets is found in plans of The Standard Parts Company to increase its European trade. With this in view Dan C. Swander, sales director and vice president of The Standard Parts Company, sailed on the "Carmania" from New York on June 5, planning to visit manufacturers in England, France and other continental countries.

The Standard Parts Company had some desirable foreign connections before getting into war work, and has recently received inquiries which indicate a likelihood that its export work may be increased to a substantial volume.

Mr. Swander will investigate the possibilities of the market and make some study of conditions as to present and probable requirements, particularly in the motor car, truck, trailer and tractor fields. He expects to be absent until August.

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Akron Boy Scouts on 3,000-Mile Motor Hike

Fifty boy scouts with their officers left Akron, Ohio, June 26, on one of the most unique motor-truck camping trips ever attempted in America.

The expedition, arranged through the generosity of The Goodyear Tire & Rubber Company, will consist of a caravan of five big trucks diverted from that company's Akron-Boston express line, where they are constantly transporting rubber products.

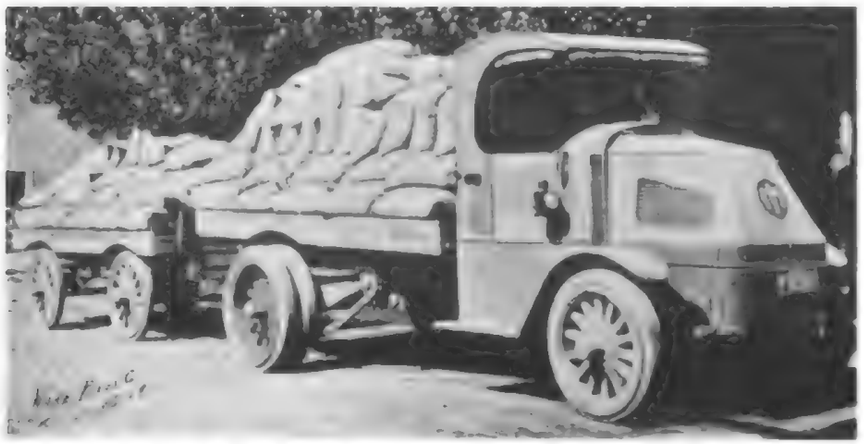
The party will cover 3,000 miles and pass through nine States, visiting the beautiful scenic and historical points along a route leading through Niagara Falls, Syracuse, Utica, Albany, Lake George, Lake Champlain, White Mountains, Portland, Me., Boston, Providence, New Haven, West Point, Ithaca, Lake Chautauqua and Youngstown, back to Akron.

Three large trucks will carry the party, a fourth will transport the baggage and camping outfits, while a fifth will carry the field kitchen and the eats. The scouts will camp beside lakes and scale mountains and sleep in the shadows of old forts where antiquated cannon boomed forth a hundred years ago.

A moving picture scenario has been written for the scouts and they will enact various scenes for the cameraman.

The pneumatic tired trucks, with double deck providing upper and lower sleeping berths, insure the same comfort for passengers as that furnished in Pullman cars. Two shifts of drivers will be with each truck, permitting travel at night while the boys are rolled up in their bunks.

The expedition, aside from furnishing a tour for the scouts, will demonstrate the ease with which troops can be transported by truck from inland points to the coast. Messages from the governor and mayors in one State to similar officials in other States, will be carried by the scouts, while scout councils along the route will welcome the caravan with receptions and demonstrations. This is the second motor hike of the Akron scouts, the first having been taken last summer through the courtesy of Vice-President P. W. Litchfield, of the rubber company, who is president of the Akron Council of Boy Scouts. The party is to be composed of selected scouts, picked in competitive examination for their general knowledge of scoutcraft.



This Mack 3½-ton truck, with a 2½-ton trailer, hauls a load of 18,870 pounds of wheat in bags.

Assured Future of the Motor Car

"The Nation's Business," published by the Chamber of Commerce of the United States, points out that among the many industries largely dependent upon steel and iron production, for needed material, few seem to have the assured future that falls to the lot of automobiles.

Those owning automobiles are never content to be without them, and as time goes on, usually purchase new machines. They are no longer luxuries, but rather as distinctly a part of an advancing and progressive civilization as are the railroads, the telegraph and the telephone. Automobiles are mostly largely owned, in proportion to the inhabitants, where intelligence and education are most rampant, as is well evidenced in the States of Iowa and Kansas. They are among the best possible educators, enlarging the mental horizon and interest of their owners and taking away that provincialism and local ignorance and prejudice which always comes from too restricted intercourse with comparatively few people. Motor vehicles are the greatest factor today in solving that profoundly vital problem of keeping the farmer on his farm.

Moreover, in the form of auto trucks, they furnish economical and rapid methods of marketing farm products, especially to the fruit and truck garden growers in the vicinity of large towns and cities.

Incidentally the sale of automobile sundries has grown within a very few years to be one of enormous volume with the distributing trade.

York Bending Co's New Equipment

The York Bending Co., York, Pa., manufacturers of hickory and oak bent rims and hickory and oak spokes, have completely modernized their plant with some of the very best equipment, besides building an addition to their factory for increased production.

Among the new installations is a steam retort which will steam stock thoroughly and prevent checks and splits in heavy oak and hickory rims.



Akron Boy Scouts on a Long Motor Hike in Goodyear Co.'sTrucks, Running on Goodyear Giant Pneumatic Tires.

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If it "*looks*" like leather
If it "*feels*" like leather
If it "*wears*" like leather
It is COTEX

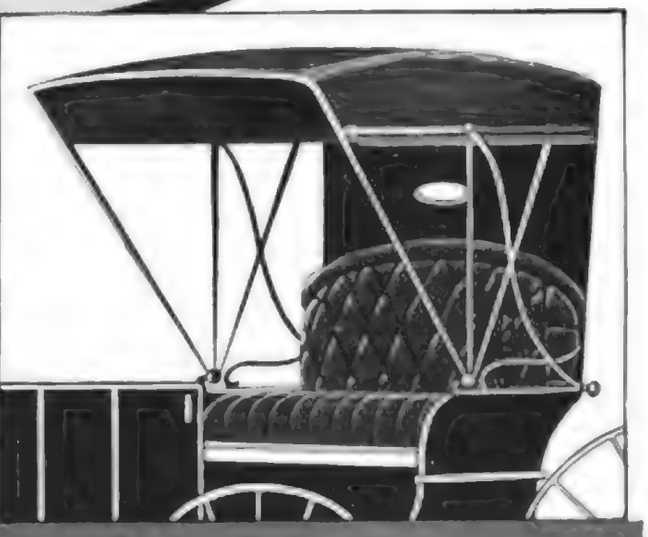
The Dependable

LEATHER CLOTH

Made in a variety of
Weights
Colors
Grains

Write for Samples

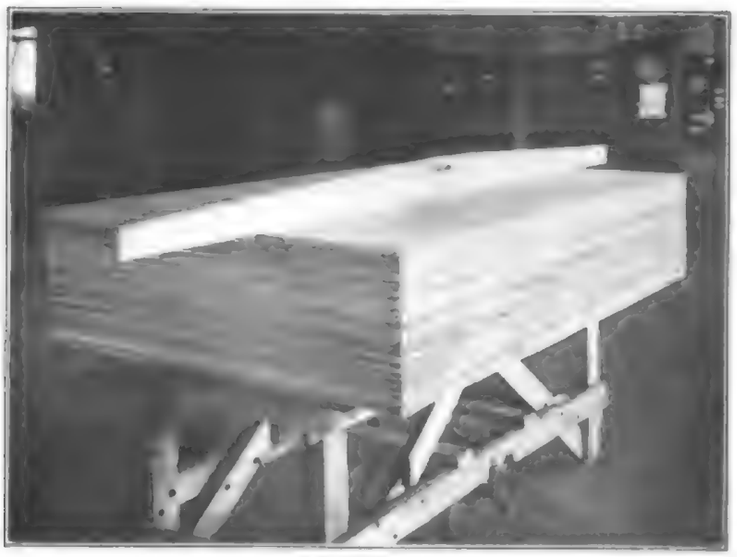




The COTEX Company
Sales Office
366 Fifth Ave. NEW YORK
Factory
337-343 Oliver St. NEWARK, N. J.

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Why Haskelite flat panels



A shipment of 5-16" panels ready to leave the factory. The square-edge troves them true and flat as plate glass

1. Haskelite glue must absorb water in order to set; once set it cannot re-dissolve.
2. Each sheet or ply goes into the gluing process dry.
3. The wet glue is spread and within a few moments the plies are in the hot press; no time has been allowed for the plies to swell.
4. The hot press closes with a pressure of 150 lbs. per square inch and a temperature of 210 degrees Fahrenheit. The glue sets — forever, impregnating the very cells of the wood.
5. The panels of Haskelite leave the press "steaming hot"; excess moisture passes off in cooling; but as a final precaution the panels are "conditioned" under flat constraint to a standard uniform moisture content.
6. No chance has been given the plies to develop a pull against each other.
7. The insoluble glue not only holds firm under the water-and-heat conditions of moulding, but more than offsets any microscopic stress which might tend toward cracking or checking; the core itself is of seasoned Red Gum, which absorbs more slowly than other woods; the glue so coats the core with waterproof protection that it does not respond to moisture-changes.

The Waterproof

HASKELITE

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ıre once and for all *flat*



A shipment of 7-8" Haskelite panels ready to make into dashes and instrument boards. The square-edge proves them true — Haskelite glue will keep them true

The extraordinary success of Haskelite in vehicle manufacture is due to (1) the use of a glue that takes up moisture in setting, (2) initially dry veneers, (3) swift handling, (4) the use of a slow — absorbent wood, (5) skillful workmanship and (6) scientifically proportioned plies.

The Haskelite Research Laboratories have issued the following bulletins as aids to body builders:

"What is Haskelite?"
"Why Haskelite Panels are Flat"
"Why Haskelite Locks the Door Against Warpage"
"Comparative Properties of Mahogany, Poplar and Gumwood"
"Startling Facts".
(An engineering bulletin on the strength of Haskelite)
"How to Obtain Best Results in Painting and Finishing Haskelite"

WRITE FOR ANY OR ALL OF THEM, FREE, TO

HASKELITE MFG. CORPORATION

CHICAGO
Chamber of Commerce Building

GEORGE R. MEYERCORD, *President*

NEW YORK
120 Broadway

Mouldable Plywood

HASKELITE

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Kiln Drying of Timber in the Vehicle Trades

The automobile, truck, wagon and carriage industries—or to use a collective term—the vehicle industry of the United States, uses an enormous quantity of lumber. Into bodies, wheels, shafts, poles, and bows this great amount of wood is worked up in the several thousand vehicle and vehicle parts factories included within the industry. Every piece of this timber, as rims, spokes, hubs, sills, panels, the shafts, poles, bows, etc., should be perfectly dried before entering into the state of a vehicle part, or the part will fail in the purpose for which it is intended.

The satisfactory drying of vehicle stock has been a problem that has caused trouble to vehicle builders ever since the ancient Egyptians constructed their chariots of war, or the Romans made those wagons which overran all southern Europe in the days of the later republic and the empire. Indeed, it is only within the last few years that vehicle builders have been able to find any improvement over the old, uncertain method of letting Nature do the work of drying their timbers. Sometimes Nature performed the job very well indeed, but there was no uniformity in the results, and when the wood did turn out just right it was more like an accident than the outcome of a preconceived plan. The owner of the lumber had very little control over the drying process.

As man has improved on so many of Nature's methods, so at last there have been perfected devices and methods that insure absolute certainty and uniformity of results in the seasoning of vehicle timbers.

These devices and methods have been worked out by a number of the most experienced and intelligent timber experts in this country, including government forest laboratory officials and manufacturers of wood products of long experience in the actual operation of wood-using plants.

The quintessence of their experiments and discoveries in the art of wood drying has been made commercially available and their recommendations are incorporated in the timber drying kilns manufactured by the National Dry Kiln Co., Indianapolis, Ind.

National Dry Kilns in Wheel Plant

As to the application of National dry kilns in the vehicle trades, a visit to the plant of the Schwarz Wheel Co., Philadelphia, Pa., will furnish an example of the difficult work easily accomplished with this kiln. The Schwarz Wheel Co. probably furnish more automobile wheels to high-grade car manufacturers than any other concern in their line, and as they number the leading automobile makers among their customers, nothing short of perfect drying of stock will satisfy this concern. The Schwarz dry kilns were ordered for the express purpose of drying 4 by 5 inch green hickory billets for automobile wheels. Those familiar with the subject will realize what a problem the drying of green hickory of such size means. Yet the National dry kilns do this work with less than 1¼ per cent. of culls.

Other concerns whose names are familiar to our readers who are drying heavy green oak and hickory stock with equal satisfaction are the Turnbull Wagon Co., Defiance, Ohio; Imperial Wheel Co., Flint, Mich., and W. K. Prudden & Co., Lansing, Mich. A dry kiln that will dry green oak and hickory fresh from the saw and in large dimensions is certainly a successful dry kiln, as any lumber expert will testify. As a matter of fact the Nationals dry any sort of timber from the lightest of soft wood to the densest pieces of timber that ever enter into vehicle construction.

The importance of selecting the right dry kiln for an automobile body factory cannot be over-emphasized. The dry kiln becomes a large and important part of the factory and it must be right in order that the whole may be right. Wideawake manufacturers, we are glad to say, are appreciating these facts a great deal more every day. They are going to a great deal of trouble to ascertain just what the best method is and are learning to discriminate very clearly between honest evidence and mere bunk.

The C. R. Wilson Body Company, Detroit, Mich., spent a great deal of time and considerable money investigating the merits of the various dry kilns, and selected National kilns, believing them to be the very best thing obtainable for automobile body work.

As the installation of National kilns at the Wilson plant is typical of what is needed by the larger body concerns, a complete general specification follows:

National Kiln Installation for Large Body Plant

Ten compartment kilns, 18 feet 10 inches wide, 54 feet long, 12 feet high. Door openings 12 feet by 18 feet 6 inches, both ends, fitted with Hussey door carrier equipment. Buildings of brick, roof slab of tile and concrete, with tar and gravel top.

Steel post foundation for track and pipe support four feet high, consisting of I-beam posts, cross channels, malleable flanged bases, malleable top clamps, wrought iron braces, with turnbuckles, bolts, clips, etc.

Thirty-five pound tee rails (three runs per room), for crosswise piling.

Eighteen ventilating openings in each room, fitted with volume dampers, operated at end of kiln by means of connecting rods.

Fresh air ducts (two in each room) with openings distributed over floor of kiln, controlled by volume dampers at operating pit.

National patented six unit vertical heating system, consisting of six separately controlled radiating units in each kiln, suspended in vertical position from cross channels, on special hangers. Each radiating unit equipped with valves on feed and drain connections in operating pit.

Heating system designed and equipped for the use of exhaust steam and live steam at low pressure. Drainage arranged for vacuum return system, with all necessary traps and appliances.

Complete truck equipment, consisting of 720 National cross piling trucks, 6 feet long, equipped with No. 1 malleable iron wheels, channel sides and cold rolled steel axles and bearings.

Three No. 9-B 779-A cross piling transfer cars, complete with 10-inch malleable iron wheels, channel sides, wrought iron brace rods with turnbuckles, 35 pound tee rails to receive cars, special malleable clamps and separators, cold rolled axles and bearings.

Ten recording thermometers (one for each kiln), with 10 feet extension tubes, set in special locked cabinets at operating end of kilns.

Other users of National dry kilns in the vehicle industry are Rex Buggy Co., Connersville, Ind.; Sheller Wood Rim Mfg. Co., Portland, Ind.; Briggs Mfg. Co., Detroit, Mich.; Racine Mfg. Co., Racine, Wis.; Columbia Wagon Co., Columbia, Pa.; Auburn Wagon Co., Martinsburg, Pa., and others equally prominent in the trade.

Valuable Data From English & Mersick Co.

The English & Mersick Co., New Haven, Conn., have issued their wholesale discount sheet dated June 1st, 1919, and a supplement, covering concealed door hinges, curved door hinges and door window flappers for the frameless glass type; also door locks, door handles, and an electric limousine side lamp. These circulars should be on the desk of every automobile and motor body manufacturer. As the straight line drop glass has been generally adopted on enclosed folding top bodies, the door window flappers for the frameless glass type are much needed.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

REPRESENTATIVES WANTED. A company manufacturing automobile fabrics has various territories open for experienced representatives on a commission basis. When writing state territory covered and full particulars. Address "310," care THE VEHICLE MONTHLY, Philadelphia.

SUPERINTENDENT OR GENERAL FOREMAN. High grade man on manufacturing open or closed auto bodies desires change. Good organizer. Active and progressive executive. Address "315," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—To buy a second hand sheet metal working hammer. Pettingell, Quickwork, or any other make along the same line. Large or small. M. D. YETTA, Connersville, Ind.

FOREMAN wanted for blacksmith shop. Will have charge of forging department, and assembling truck bodies. A trained man who understands drawings, and can handle men. This is a good job in an Eastern city. Address "320," care THE VEHICLE MONTHLY, Philadelphia.

DESIGNER AND DRAFTSMAN wanted by progressive automobile body company. Good salary for the right man. Must be qualified to work on both closed and open bodies. BRIGA BODY COMPANY, Framingham, Mass.

FOREMAN TRIMMER WANTED.—One that is experienced in high-class custom coach work, to take charge of shop in one of the large cities of the Middle West. Ideal working conditions; please state salary expected, age, nationality and general capabilities. Address "325," care THE VEHICLE MONTHLY, Philadelphia.

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SALES COME EASY

WAGON AND BODY BUILDERS
ACT QUICKLY IF YOU WANT LOCAL AGENCY

for the

TRADE HORIZONTAL HYDRAULIC MARK

Dumping Unit





APPEALS to cartage men and contractors everywhere. Allows use of full length bodies. Can be used on any make chassis. Eliminates use of wire rope, rope clips and sheaves. No portion of hoist higher than chassis seat. Does not interfere with ground clearance of chassis.

Write for further information and terms to representatives

Horizontal Hydraulic Hoist Co.
456 Book Building :: DETROIT, MICH.

FORGINGS

OF GUARANTEED ACCURACY

For Automobiles, Motor Trucks and Special Work

We also make a large line of Drop Forged Carriage and Wagon Hardware

OUR MOTTO:
HIGH GRADE WORK AND PROMPT SERVICE

Send your Models or Blue Prints for Quotations
Write for our Latest Catalogs

RICHARD ECCLES COMPANY
FOUNDED 1880
AUBURN, NEW YORK

You Can Do Better Welding

NO BAD WELDS—NO LOST HEAT

When "LAFFITTE" is Used



A TRIAL will convince you—that by using **LAFFITTE WELDING PLATES** a more satisfactory weld can be made and at a lower cost.

These plates are in the form of a plate 4 x 8", chequered and easily broken by hand to any desired size.

They chemically weld iron and steel of any kind at a low heat in one-third of the time, fuel and labor. There is no waste using these plates as with powders.

One to a hundred welds can be made from one plate. No special method or equipment required.

SAMPLES FREE ON REQUEST

Extensively used by Railroads, Ship Builders, Government Shops, Machine Shops, Foundries and Blacksmiths

Your Jobber Handles LAFFITTE

The Phillips-Laffitte Co.
Pennsylvania Building Philadelphia, Pa.

Pettingell Machines

INSTALL OUR METAL AND WOOD WORKING MACHINES AND TRY THEM ON YOUR WORK. THEY ARE DESIGNED TO MEET YOUR REQUIREMENTS

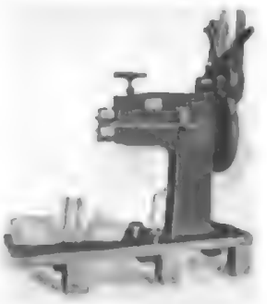
OUR HAMMERS—BEADERS—ROTARY CUTTERS—ROLLERS—BEVEL AND MITRE SAWS—AND SAW TENONERS WILL STAND UP UNDER EVERY TEST IN YOUR FACTORY

GIVE THEM THE TEST

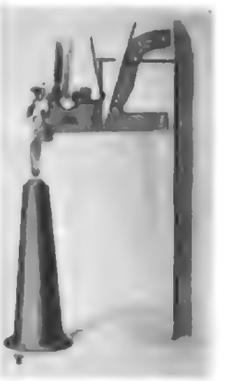
We Guarantee Every Machine to do all that we claim for it



No. 2 Power Hammer



No. 7 Power Beader



No. 4 Mallet Hammer

PETTINGELL MACHINE COMPANY

AMESBURY, MASSACHUSETTS

Trailmobile

Trade-Mark Reg. U. S. Patent Office

The Motorless Motor Truck

—

Thousands in Use

—

SIZES
1,250 lbs.
1,500 lbs.
2,000 lbs.
3,000 lbs.
7,000 lbs.
10,000 lbs.

Also semi-trailers

—

Bodies for every business

—

Contractors to the U. S. Government.

More Profit—That is All Profit

SELLING the Trailmobile offers you a larger market, a broader business than you now have, and a most satisfactory profit that will grow steadily.

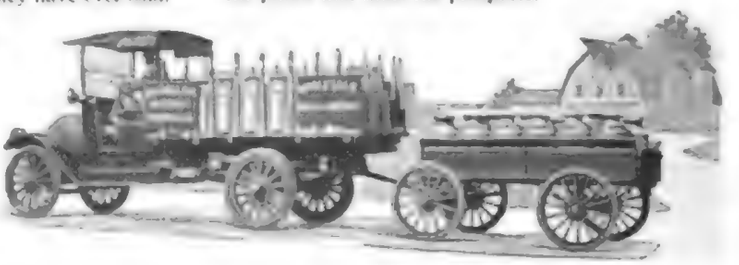
That profit is a real profit—it is not wiped out by expenses after the sale. Service for Trailmobiles costs practically nothing. Our present dealers write us that it costs them less to handle the Trailmobile than any line they have ever sold.

The profit margin is the same as that on the most-sought-for cars and trucks. Truck owners, and passenger car owners who have hauling to do, are buying Trailmobiles in greater numbers every day. The demand is firmly established. Dealers everywhere find this a profitable account that grows more profitable.

A big national advertising campaign educates the public and finds the prospects.

The Trailmobile Company
574 E. Fifth St.
Cincinnati, O.

We want high-grade dealers where we are not now represented. If you have proved that you can sell to business men or farmers write or wire for the details.

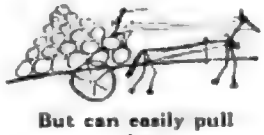


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Get the Idea of the Martin Method



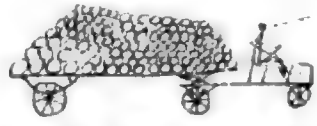
A horse cannot carry more than ¼ ton



But can easily pull a ton



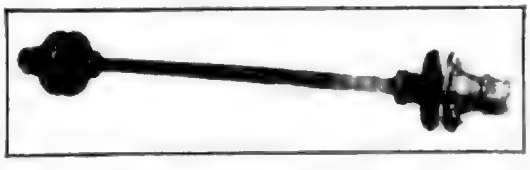
A runabout will soon break down under a ton strain



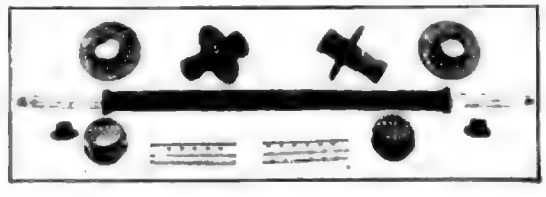
But the same runabout can easily pull 2 to 3 times its carrying capacity

NOTE: The business of building trailers is growing very fast. We are equipped to furnish parts and complete assemblies—Rocking Fifth Wheels, Axles, Springs, Fittings, etc. We call especial attention to the

Martin Floating Bearing Axle



Photograph of Axle Assembled



Photograph of Axle Dissembled

Frictionless, indestructible, will not stick, will not cut, will stand the strain of steel tired wheels, can be run many hundreds of miles at high speed without renewing grease. Not the cheapest, but the best trailer axle in the world.

The Martin Floating Bearing Axle is, as the name implies, an axle with a bushing which floats between the shaft and the hub. It is as indestructible as a plain bearing. It retains grease like a roller bearing and is therefore as frictionless. The floating bearing type of axle is not new. It has been used in Europe for many years with great success.

The special features of the Martin Floating Bearing Axle are the means of lubrication and the means of retaining the lubricant. There are grease reservoirs consisting of holes bored in the floating bearing in a spiral so that in every revolution both hub and spindle are oiled. There is a felt washer which prevents grease from getting out at one end, and as the hub cap fits directly against the hub flange, it prevents the grease from getting out at the other end.

You will be interested in the illustrated, fully priced and descriptive booklet, MARTIN SEMI-TRAILER METHODS OF HAULING. Send for it.

MARTIN ROCKING FIFTH WHEEL COMPANY

P. O. Box 1214 f

SPRINGFIELD, MASS.

Manufacturers of

MARTIN
ROCKING FIFTH WHEELS
SEMI-TRAILERS
SEMI-TRAILER PARTS

MARTIN
REAR END ASSEMBLIES
FLOATING BEARING AXLES
CASTOR JACKS

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All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Patent Power Take-off.

Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent, No. 1194994.

A Transmission Which Simply Defies Trouble

If there were no other reason for preferring Gramm-Bernstein trucks, B. A. Gramm's transmission alone would be reason enough.

Think of the expensive things which **can,** and **do** happen every day, to truck transmissions. Then note that **not one** of them can happen to ours.

Eighteen years of truck experience have shown us how to cure the one great and expensive transmission fault.

The Gramm-Bernstein gears are never shifted —hence they cannot possibly be clashed or ground or chipped.

Speed changes are made by means of patented dog clutches—strong and tough and sturdy.

These clutches enable easy shifting at any time and into any speed, going fast or slow, up or down hill.

This is especially valuable in hilly sections. The driver can use engine compression for braking—thus saving much wear and expense on brakes.

The gears are mounted on extra large bearings. They revolve on a heavy six-spline shaft. They simply cannot get out of alignment.

In the entire transmission assembly, for example, there is not a single pin, stud, set-screw, bolt or key which by any chance could work loose and fall out with resulting serious damage to the entire gear set.

This transmission is basic superiority. It goes to the very root of truck value and truck service. It is one of the factors contributing to the continuous hauling and the consequent economy which distinguish Gramm-Bernstein records.

Gramm-Bernstein worm-drive trucks are made in 2, 2½, 3½ and 5-ton capacities—sold with complete equipment, at a flat price. Ready for the body—not an extra to buy.

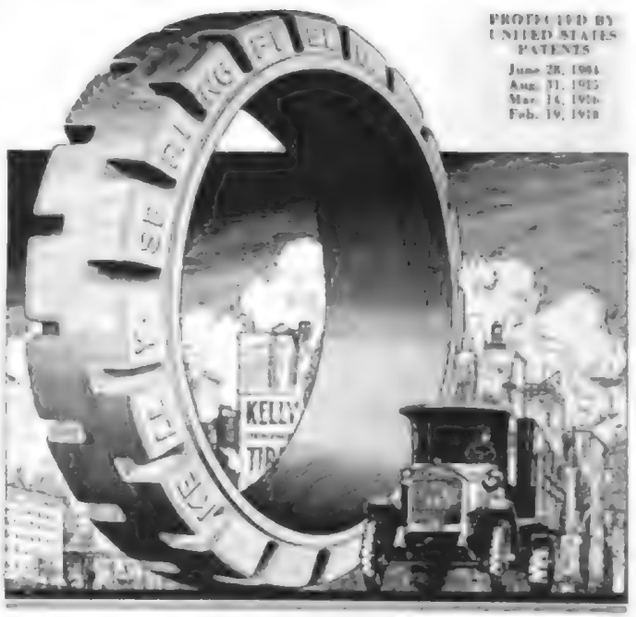
The 2-ton chassis, equipped, at $2700, is under the average of prices asked by 61 manufacturers for 2-ton chassis without equipment

The Gramm-Bernstein Motor Truck Company

Lima, Ohio U. S. A.

Pioneers since 1901—Builders of the First Liberty (U.S.A.) Truck

GRAMM BERNSTEIN



Caterpillars add to the life of a truck

Aside from their extraordinary traction qualities and ability to deliver mileage, the most frequent comment we hear from truck owners who have put Kelly Caterpillars on their trucks is that the trucks go less often to the repair shop.

The reason for this is simple.

The Caterpillar's unusual depth of rubber and patent-protected system of side vents make it more resilient than the ordinary type of standard truck tire. Instead of passing along road shocks to the engine and chassis it absorbs them.

After all, saving the truck is the most important function of a truck tire. That is why the owners of many of the biggest fleets in America have changed to Kelly Caterpillars.

KELLY-SPRINGFIELD TIRE CO.

General Sales Department 4614 Prospect Avenue

CLEVELAND, OHIO

KELLY SPRINGFIELD TRUCK TIRES

CATERPILLAR TREAD

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This Good Rubber Means Good Roads

—so far as the comfort of the ride is concerned and the protection to the vehicle. You get both in full measure with the light, strong

Firestone Carriage Tires

You get style, too. For, although Firestone rubber is light in weight, the tires have sufficient bulk for elegant appearance. Strong enough to wear down to the channel uniformly. Write your jobber or us.

FIRESTONE TIRE AND RUBBER COMPANY
FIRESTONE PARK AKRON, OHIO
BRANCHES AND DEALERS EVERYWHERE







Hand Hoist for Ford Truck

(Patents Pending)

TAKES no room back of cab. is easy of operation, simple and neat in appearance.

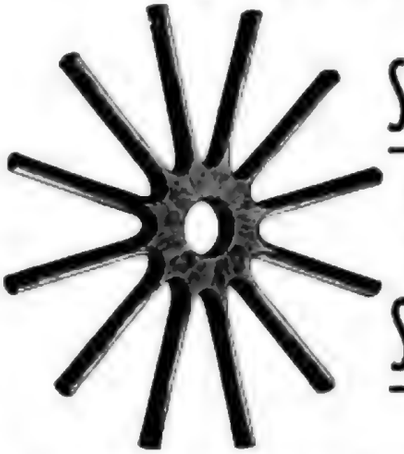
Shipped on sub-frame, ready for mounting on chassis. Easiest for the body builder to install and best—because it always makes a satisfied customer.

Write for photos and blueprints.

Truck Engineering Company
7031 Broadway
CLEVELAND, OHIO

Motor Wheel Repairing

Made Worth While by



SCHWARZ WHEEL SPIDERS

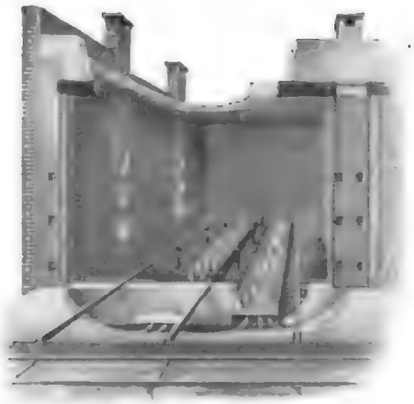
They eliminate the nuisance of taking out damaged spokes and inserting new ones.

Just apply felloes and metal rim and job is complete.

Write for Further Particulars and Prices

SCHWARZ WHEEL CO.
FRANKFORD, PHILADELPHIA

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It Dries Oak Green FROM THE SAW

Any lumberman will tell you that's proof a-plenty for the success of

THE NATIONAL DRY KILN

It also dries all other kinds of lumber, from the lightest of soft wood for panel work to heavy green hickory billets for motor truck spokes.

Our booklet *"21 Answers"* will be found very valuable. Ask for it, also for a copy of the National Catalog.

THE NATIONAL DRY KILN CO.

1200 EAST MARYLAND STREET -:- INDIANAPOLIS, IND.

The Answer

TO THAT TRAILER AXLE QUESTION IS

The Concord Plain Bearing Axle

It has proven its worth in actual trailer service. Made for light, medium and heavy work.

We can deliver promptly. Write for particulars.

CONCORD AXLE COMPANY - PENACOOK, N. H.

COLUMBIA WAGON CO.

COLUMBIA, PA.

WE have completed our contracts with the Government and are now back to normal conditions. We hope to hear from our trade. Our new price lists are ready to send out.

We have been doing our best to serve our customers, but, owing to our part in aiding Uncle Sam win the war, we could not always make deliveries when promised. However, you can count on us hereafter to furnish promptly the well known COLUMBIAN BODIES for motor trucks and our general line of wagon work.

Catalogs upon request

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EMPIRE ART METAL CO. Inc.

COLLEGE POINT N.Y.

A Standard of Quality, Service & Workmanship We are prepared to supply you with STEEL SHAPES for every conceivable requirement

we have over 2000 sets of Rolls



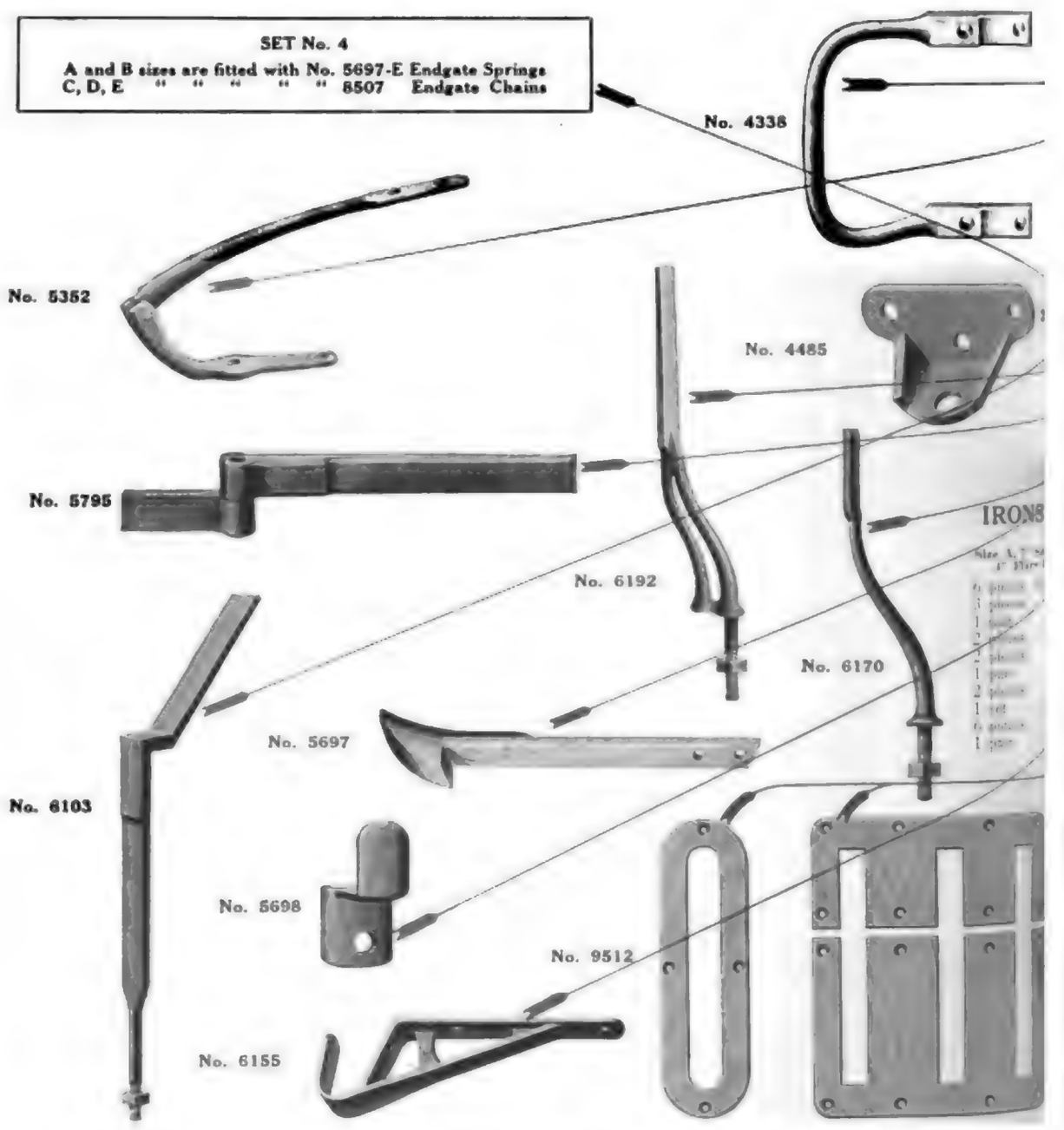
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EMCO MALLI

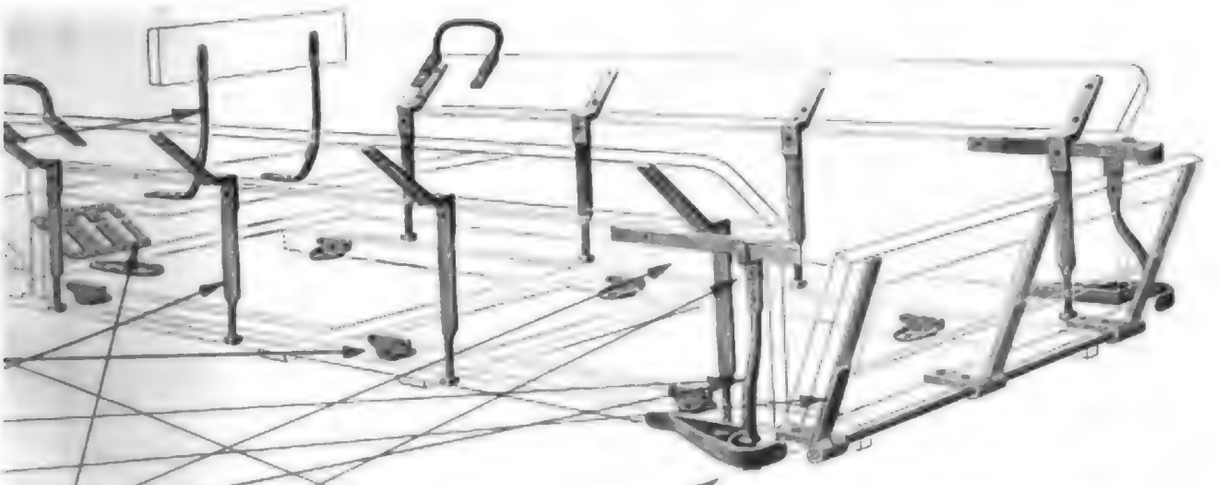
SET No. 4

A and B sizes are fitted with No. 5697-E Endgate Springs
C, D, E " " " " " 8507 Endgate Chains



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ABLE IRONS



Set No. 4

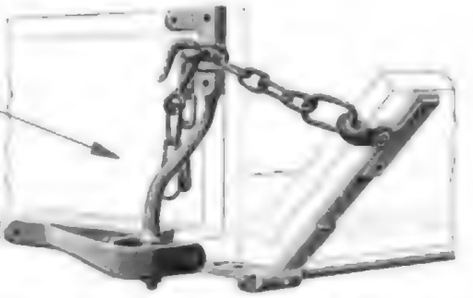
PEN FLARE BOARD BODY

D IN THE CONSTRUCTION OF THIS BODY

Size B, 8" Side Panel
5" Flare Board

.. 6 pieces	No. 6103-H	Body Brace and Flare Board Irons
. 3 pieces	5792-A	Endgate Hinges
. 1 pair	8507-E	Endgate Springs
. 2 pieces	5698-A	Endgate Spring Guards
... 2 pieces	6170-M	Body braces, rear end
1 pair	5352	Jointed Lazy Back Irons
..... 2 pieces	4338	Seat Handles
..... 1 set	9512	Foot Board Plates
..... 6 pieces	4485	Body and Chassis Connections
..... 1 pair	6155-A	Sill Braces

Emco Quality Insures Service



Write for our Bulletin "Assemblies of Irons"

10" Side Panel Flare Board		Size D, 12" Side Pans 7" Flare Board		Size E, 14" Side Pans 8" Flare Board		
es No. 6103-C.....	8 pieces	No. 6103-D.....	8 pieces	No. 6102-M	Body Brace and Flare Board Irons
es 5795-C.....	3 pieces	5792-D.....	3 pieces	5792-G	Endgate Hinges
8507-A.....	1 pair	8507-B.....	1 pair	8507-C	Endgate Chains
6192-A.....	1 pair	6192-B.....	1 pair	6192-B	Body Braces, rear end
6182-B.....	1 pair	6182-B.....	1 pair	6182-B	Body Chain Eyes
5352	1 pair	5352	1 pair	5352	Jointed Lazy Back Irons
es 6141-H.....	2 pieces	6141-G.....	1 set	6141-G	Inside Corner Irons
es 4485	6 pieces	4485	1 pair	4485	Body and Chassis Connections
es 4338	2 pieces	4338	2 pieces	4338	Seat Handles
9512	1 set	9512	6 pieces	9512	Foot Board Plates
6155-A.....	1 pair	6155-A.....	2 pieces	6155-A	Sill Braces

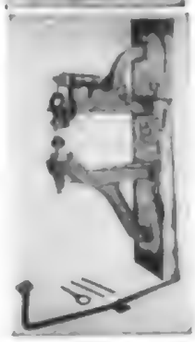
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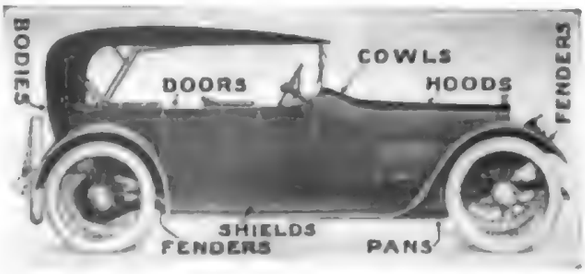
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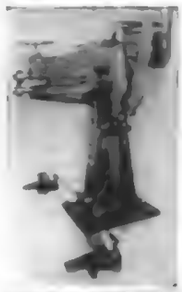


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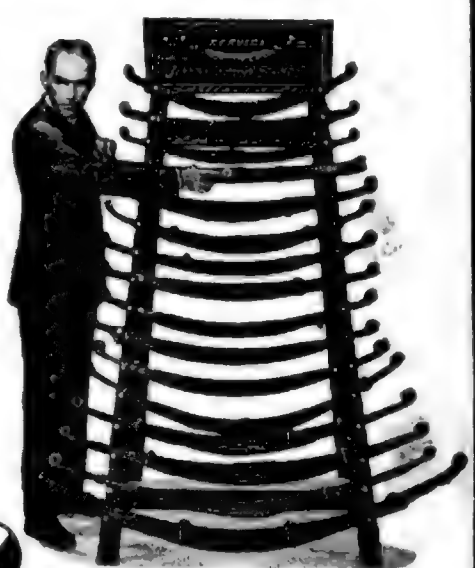
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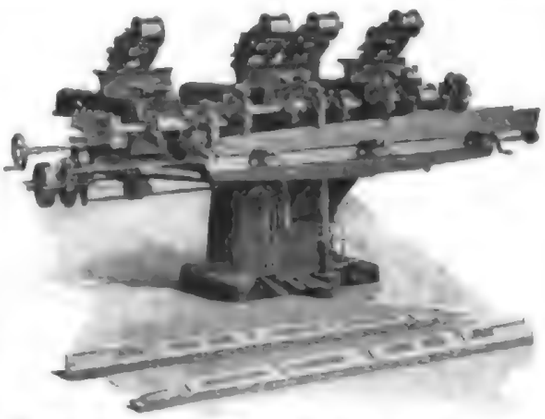




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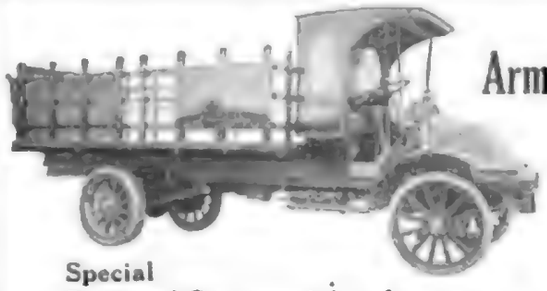


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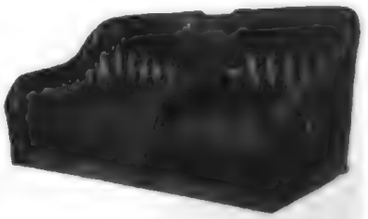
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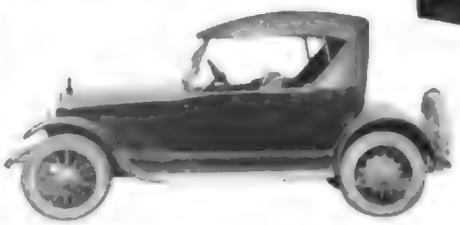
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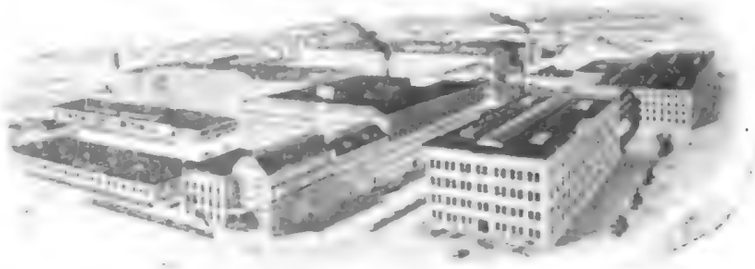
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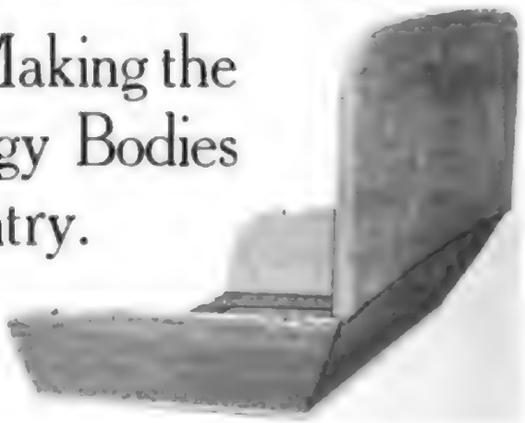
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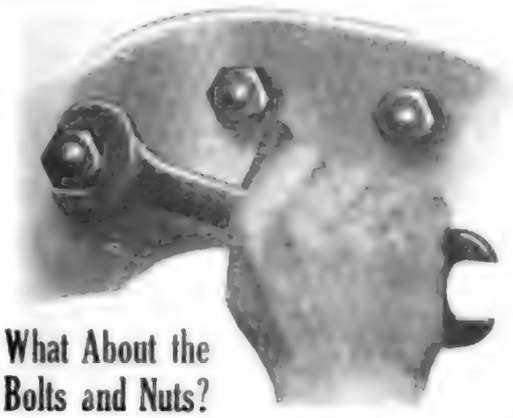
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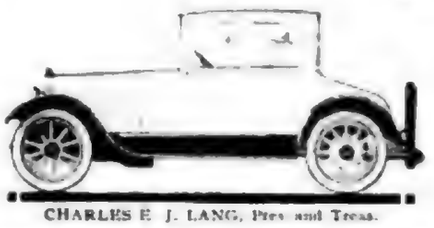
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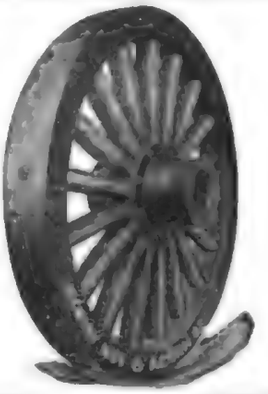
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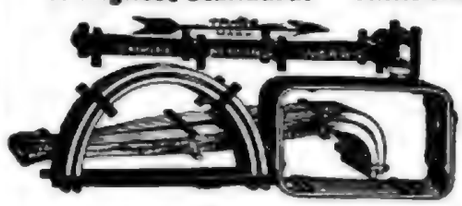
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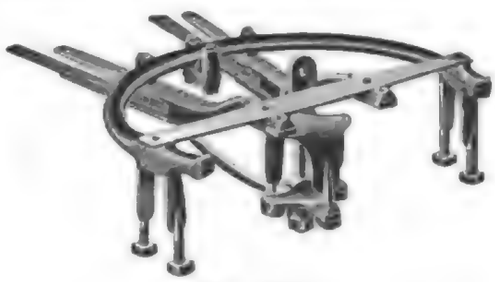
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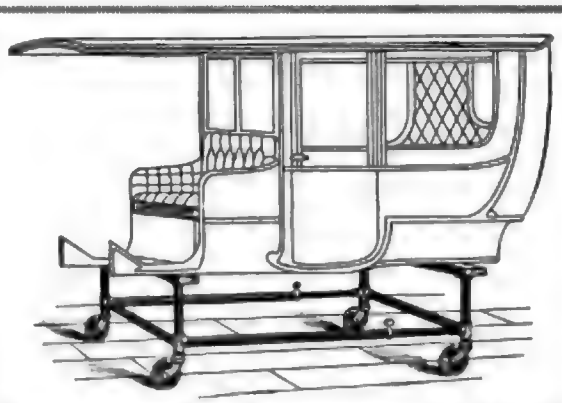
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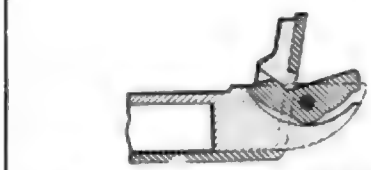
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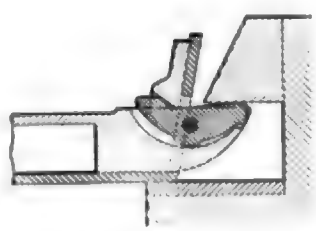
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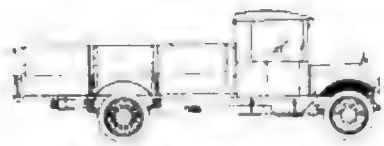
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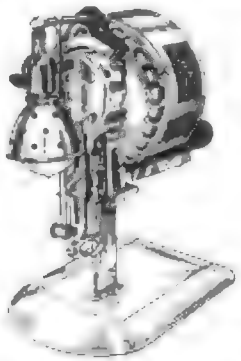
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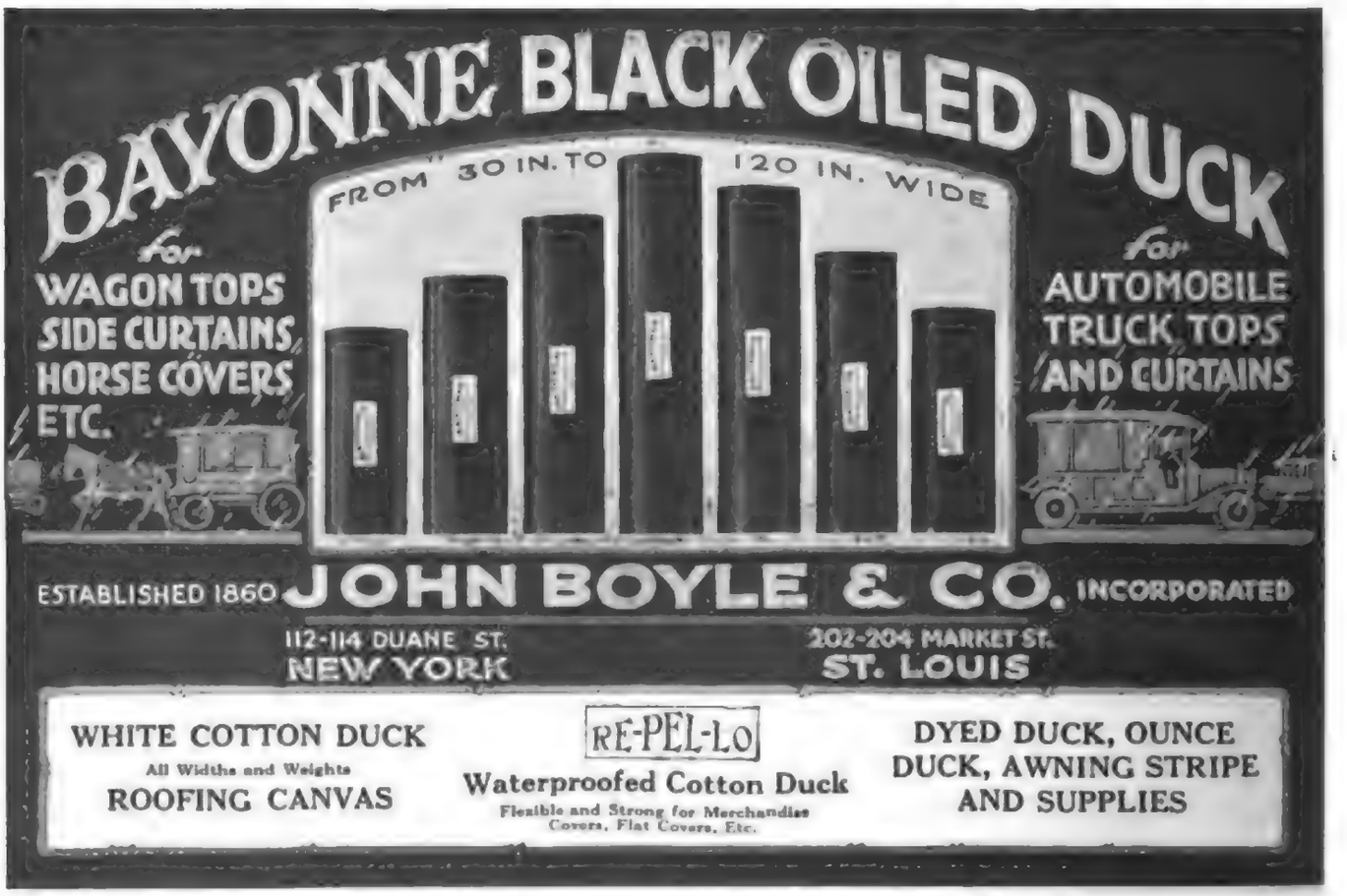
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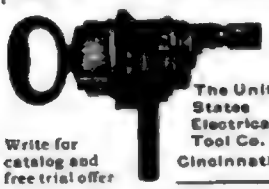
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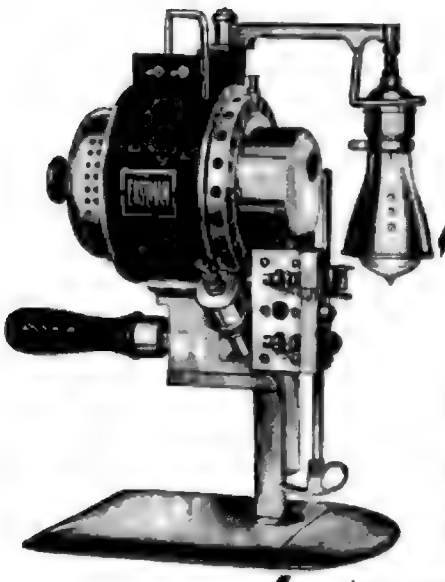
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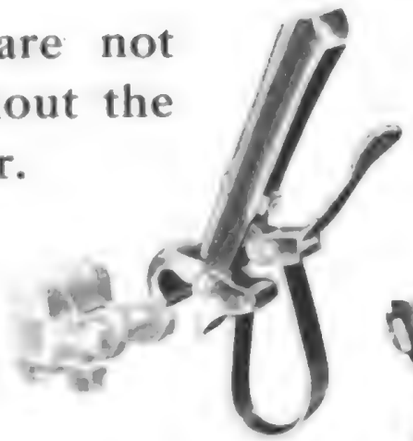
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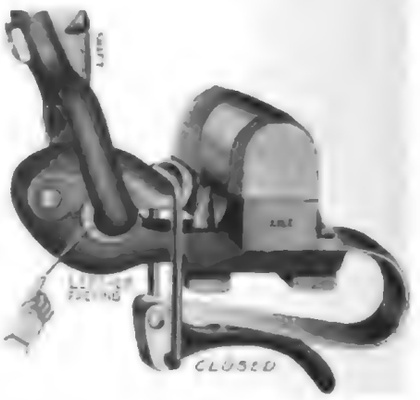
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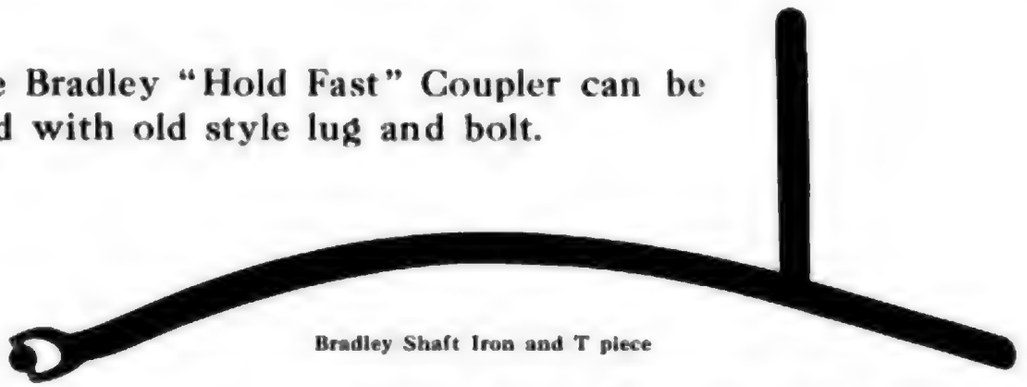




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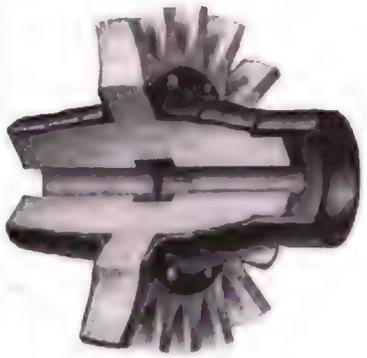
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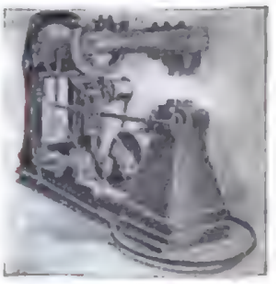
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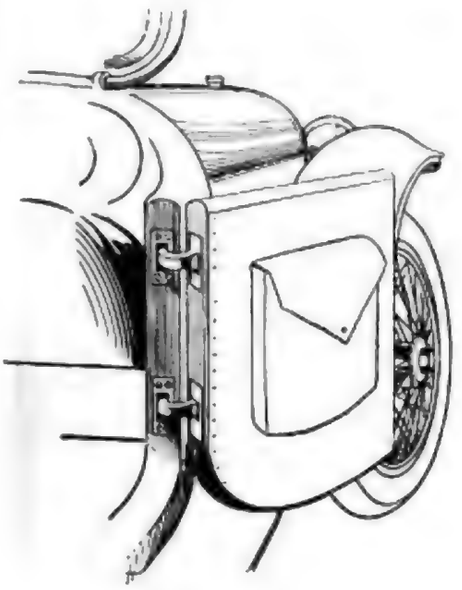
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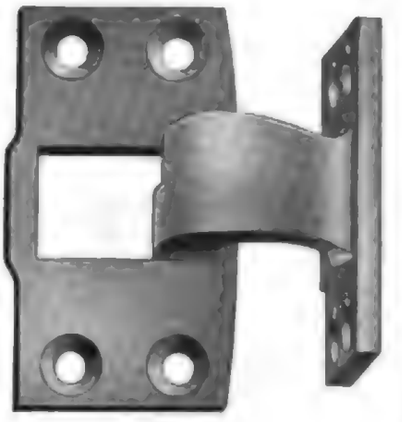
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OUR advertising manager in preparing an article on business conditions for The Standard Parts Messenger wrote Mr. Overman for his viewpoint on the subject. Mr. Overman's letter, quoted below, is of such interest, we believe, as to merit publication here.

July 7, 1919.

MY DEAR BRADEN:

This is in response to yours of the 3rd, relative to the State of Trade in my Department.

Conditions in the Vehicle Industry have made a remarkable improvement in the last sixty days, due to the fact that crop prospects throughout the entire country never were finer, and the uncertainty regarding Steel Prices has been dispelled.

Every well informed buyer believes there will be no reduction in Steel Prices within this year, and most of them are confident that there will be an advance in the not distant future.

Orders are coming, strong and steady. Our Plants are very busy. Our Export Business is very good, indeed.

Many Vehicle Builders have advanced their selling prices and all of them are running at top-notch capacity. The demand for Buggies is wonderful and seems to be steadily increasing.

We are enlarging our capacity and adding new equipment. We are directing our energies toward giving our patrons the finest service ever known. Our slogan is "QUALITY and QUANTITY."

The organizations in my Plants are loyal and doing all possible to put us back on a good, prosperous Peace Basis, and I am grateful to them for what they are achieving in the way of production.

Now that Peace is an absolute, assured reality, I am an Optimist—not only as to our own business future, but for the future of all worthy industries in our Glorious Country.

Very truly yours,

E. V. OVERMAN,

General Manager Vehicle Spring and Axle Division.

THE STANDARD PARTS COMPANY

Executive Offices :
CLEVELAND, OHIO

Vehicle Division Offices :
Union Central Bldg., Cincinnati, Ohio

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THE VEHICLE MONTHLY

PUBLISHED FOR 54 YEARS AS

THE MAGAZINE FOR VEHICLE MANUFACTURERS

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Advertising rates will be furnished on application. Copy for advertisements should reach us not later than the tenth of the month to insure insertion in the following issue. Changes in advertisements should reach us not later than the tenth of each month.

The Vehicle Monthly is a member of the A. B. C.

Vol. 55, No. 5 **PHILADELPHIA, AUGUST, 1919** **Subscription Price $2.00 Per Year**

More About the Body Builders' Tax

When doctors disagree, who shall decide?

Last November, in response to numerous requests for information concerning the status of motor body builders in relation to the government tax on bodies, we addressed a letter to the Treasury Department, Washington, requesting first-hand information. Our letter and the reply from the office of Commissioner of Internal Revenue follow. This correspondence was published in our December, 1918, issue:

The Washington Opinion

"PHILADELPHIA, November 15, 1918.

"TREASURY DEPARTMENT,
"Washington, D. C.

"GENTLEMEN:—Notwithstanding the various published explanations of the matter, and with special reference to your letter of recent date to the National Automobile Dealers' Association, we, as well as the majority of *motor body builders*, are yet in the dark as to the construction of certain sections of the war tax law.

"For example: A customer (consumer or dealer) brings a new chassis to the wagon body builder, who builds and mounts upon the chassis a body (either passenger or freight body). Must the body builder pay a tax on this body?

"*Second*: A customer brings an old motor car or truck chassis to the body builder and requires a new body to replace the old, worn-out body. Does the body builder pay a tax on this body?

"*Third*. A body builder sells a body to a customer, but *does not* mount this body on any chassis, new or old, but simply delivers the body unmounted. Does he pay a tax on this body?

"We are in receipt of inquiries from Philadelphia, Wilmington, Delaware and Columbus, Ohio, on these points.

"If you can give us a definite ruling on these matters, practically the entire custom body trade of the United States will be correctly informed in the next issue of THE VEHICLE MONTHLY.

"Very truly yours,
"THE VEHICLE MONTHLY,
"A. P. CARDWELL, *Editor*."

To the above letter the Treasury Department promptly replied, in a manner that was supposed to clear up all uncertainty as to where the body builder stands in relation to his taxes:

"TREASURY DEPARTMENT
"OFFICE OF COMMISSIONER OF INTERNAL REVENUE,
"WASHINGTON, D. C., November 19, 1918.

"WARE BROS. COMPANY,
"P. O. Box 1403,
"1010 Arch Street,
"Philadelphia, Pa.

"GENTLEMEN:—Reference is made to your letter of November 15, 1918, relative to tax upon automobiles.

"You are advised as follows:

"1. Where a customer brings a new chassis to a body builder, who builds and mounts upon such chassis a body, tax applies upon the price charged the customer by the body builder for building and mounting the body upon the new chassis.

"2. Where a customer brings an old motor car or truck chassis to a body builder and requires a new body to replace the old body, no tax attaches upon such transaction.

"3. Where a body builder sells a body to a customer, separately, and does not mount this body on any chassis, old or new, but simply delivers the body unmounted, no tax attaches to such sale.

"Respectfully,
"B. C. KEITH,
"Deputy Commissioner."

The majority of body builders sell bodies to their customers on all three of the plans indicated in the above letters, and especially on the plans noted in questions 1 and 2, but it will be seen that the tax only attaches to the bodies built and mounted on new chassis. An examination of his books would reveal the number of bodies the builder had furnished and mounted on new chassis, and on these jobs he would, according to these rulings, have to pay the tax.

The Philadelphia View

But Philadelphia body builders found that the rulings contained in this letter did not seem to apply in the Philadelphia district, although Philadelphia was and is supposed to be a part of the United States and therefore under the jurisdiction of the National Treasury Department.

Due to the many misunderstandings of the law relating to the war tax on motor bodies, the Carriage, Wagon and Motor Body Builders' Association of Philadelphia appointed a special committee to examine into the question, and with the assistance of legal talent and government agents arrive at a definite statement of the body builders' position.

This committee has made a report which has been printed and circulated, not only to actual members of the Philadelphia organization, but to all others in the local trade who are believed to be interested. The report was reprinted in the July VEHICLE MONTHLY so that its usefulness might not be confined to the Philadelphia local builders.

The rulings as obtained by the Philadelphia Association are as printed below, and it will be noted they differ in several particulars from the report furnished us by the Internal Revenue office last November:

"1. Where a body builder builds and mounts a new body upon a new chassis for a customer, who is not a manufacturer of automobiles or automobile chassis, the body builder is to charge such customer a tax of five per cent. upon the complete body.

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"2. Where a body builder builds and mounts a new body to replace an old one for a customer, who is not a manufacturer of automobiles or automobile chassis, he is to collect the same tax as though this body was put upon a new chassis.

"3. Where a body builder builds and sells a new body to a customer, who is not a manufacturer of automobiles or automobile chassis, and it is not mounted upon any chassis, the body builder is to collect the same tax as though he had mounted it upon a chassis.

"4. Where a body builder builds and mounts a new body upon a new or second-hand chassis belonging to a manufacturer of automobiles or automobile chassis, to be sold by said manufacturer as a complete automobile, the manufacturer is liable for the tax, and not the body builder.

"In regards to repairs made upon automobiles, that may be made necessary either by the parts wearing out, or broken because of accident, we recommend the following action:

"On any part or accessory to an automobile, that may be made by a manufacturer and sold as a particular part for said automobile (we having to purchase this part from said manufacturer or dealer) we pay the tax to said manufacturer or dealer, and he reports this tax to the Government.

"As it is not the idea of the Government to collect a tax twice on the same article, we would not have to report this to the Government, as we paid this tax. This would refer to any part so purchased.

"If, on the other hand, we make repairs to an automobile and take the material, from which these repairs are made, out of our common stock (such as lumber, iron, steel, bolts, screws, canvas, leather, or other trimming material, paints or varnishes) and so fit and fashion this material as to accomplish the repair needed, there would be no tax upon this work.

"Therefore, all carriage and wagon builders who do not carry any specialized automobile parts or accessories woul dnot have to collect any war tax whatever upon any repair work that they might do.

"Body makers, carriage and wagon builders who have built bodies for either new or second-hand chassis, and sold them to a customer, who is not a manufacturer of automobiles or automobile chassis, should make returns to the Government for such bodies delivered since February 25, 1919, along with check to cover a tax of five per cent. on such sales.

"These returns should be sent on regular forms furnished by the Government. March returns should include that part of February after the 25th; April returns cover April, May returns cover May, etc., etc.

Baltimore's Interpretation

Now comes a letter from a prominent motor body builder of Baltimore, who has read the rulings furnished to Philadelphia trade through the Association's committee.

"Baltimore, Md., July 2, 1919.

"The Vehicle Monthly,

"Philadelphia, Pa.

"Gentlemen:—We have just been reading your interpretation of the excise tax on bodies built and mounted on chassis, by body builders.

"We do not fully agree with you on your position in the premises. First, the tax is only three per cent. and the law applies not from February 25, 1919, but from October 4, 1917.

"Old bodies which are replaced with new bodies on old chassis are exempt. Only where new bodies are placed on old chassis which have had no bodies on previously is the tax to be paid.

"We are sure of our position as we took the matter up with the Revenue Office in Baltimore. Have had the revenue officers go over our books and make the deductions as to our responsibility to the Government.

"Our first experience cost us $1,800, but we very fortunately recovered nearly the whole sum in reply to the enclosed letter.

"We have no desire to enter into any argument, only we wish to give the trade in general the benefit of our experience.

"Leonhardt Wagon Mfg. Co."

The letter to which the Leonhardt Wagon Mfg. Co. refers as having saved them a large part of the unpaid tax was worded in such a manner as to bring in the tax without irritating the customer who received it. No one who had bought an untaxed body from the company could fail to see the justice of the claim as presented. The form of the letter was:

"Gentlemen: We have just been advised by the United States Revenue Office that we must add a tax of three per cent. on all bodies furnished since October 4, 1917. As this information has just been received, we of course did not add this tax to your invoice when we furnished you your body. If you will refer to your invoice of.....you will find the amount due to be $..... We would appreciate a prompt remittance of same, so that we can make a prompt settlement with the Government. Thanking you for your past favors and trusting to always merit your confidence, we are,

"Very truly yours,

"Leonhardt Wagon Mfg. Co.

"*This tax has nothing to do with the tax you paid when you purchased your chassis, but applies to bodies and accessories added to the chassis after it had left the manufacturer."

The Vehicle Monthly has placed these rather conflicting and confusing rulings and opinions emanating from three different cities before the Treasury Department at Washington. To date of going to press we have not received a reply, but hope in the September number of this journal to print a statement from Washington upon which vehicle body builders can rely.

Three Companies Join Trailer Association

During the past month three more trailer companies have joined the Trailer Manufacturers' Association which was organized last March and opened headquarters in May at 110 West Fortieth Street, New York. They are the Southern Motor Manufacturing Association, Houston, Texas; Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kansas, and the Los Angeles Trailer Co., Los Angeles, Cal. The association now has members in the following States: Massachusetts, New York, Pennsylvania, Ohio, Michigan, Wisconsin, Kansas, Texas and California.

Many well-known motor truck companies have been so thoroughly convinced after investigation, of the advantages and economies of trailers and semi-trailers in various lines of business that they not only recommend their use, but are themselves manufacturing special tractors for hauling trailers.

Among the companies offering such tractors as regular models are the Pierce-Arrow, International Motor, Garford, G. M. C., Locomobile, Sterling, Gramm-Bernstein, Indiana, Service, J. C. Wilson, Acme, Winther, Master, Fulton, Armleder, Moreland, Koehler, Day-Elder and Oneida. Other companies, including Kelly-Springfield, Lewis-Hall, Maccar and Dart, build tractors on special order.

European Demand for Cars

American automobile manufacturers are in the predicament of having a home demand that places them months behind in their orders at just the time when foreign business is insistently offering. The time was never so favorable for securing foreign markets as now, and naturally they are all keenly interested. For the future success and reputation of American cars abroad much depends upon the way in which the present situation is met.

The South American and Far Eastern fields are developing and exports to those countries very rapidly increasing, but their peoples are less well educated to the advantages of motor transportation and their roads as yet far from adequate for extensive use of motor cars. Europe, on the other hand, appreciates more than ever since the war, the utility and even indispensability of automobiles, and is abundantly prepared with suitable highways.

Further, the European manufacturers, as pointed out by C. C. Hanch, secretary of the National Automobile Chamber of Commerce in a recent report covering his trip of investigation to the allied countries, cannot supply the demand there existing for cars, for five years to come.

The people are clamoring for cars and paying exorbitant prices for used cars. The pressure they are bringing to bear on their Governments to admit American cars is having its effect. France has recently removed its restrictions against the importation of cars and England promises a reconsideration of the question September 1st, when it is hoped that the prohibitions there may also be removed.

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Springtime in American Business

By Christian Girl, President Standard Parts Company, Cleveland

War is either a disease or an accident to which the society of the world is susceptible. Accordingly, the war of the past several years has been equivalent to a very virulent attack of destructive disease.

Mr. Bryan was quoted as having said one good thing during the war. It was some time after the declaration of war by America, when he was asked as to his attitude, and he replied: "When war was declared discussion ceased."

Peace is at hand and talk of peace will be more helpful in the restoration from the ravages of the virulent disease we have been enduring than will any talk of war; but we must not forget some of the war's lessons and consequences.

After a long siege of serious illness a patient's appetite and ability to absorb nourishment return very slowly. The rapidity with which strength is gained depends somewhat upon the rapidity with which the convalescent does absorb nutrition.

In Europe the disease was so violent that it will take a long time for the convalescents to—first, create nutrition; second, absorb it, and, third, obtain sufficient strength thereby to enable them to adventure into new and greater realms of social and business contact.

With America, whose losses in every way—financial, physical and moral—were much less, a strong appetite, great absorbing ability and a quick recovery of vigorous strength should be in order.

A Time of Opportunity

Not only has peace arrived, with a few exceptions in remote and dark corners, but business, as we understand it in America, is at our doors, rapping loudly for admittance into every nook and corner. Our wealth is great, our energy is vibrant, our conscience clear, our hopes buoyant, and our will to do, the natural heritage of a strong people.

We are not entirely unmindful that a wave of unrest is passing over us, but we should not mistake the violence and the misjudgment of the few for the will and the heart of the many. Rather should we join with the good sense and the peaceful hearts of the many to present a united front and cure with sunshine the bad odors emanating from dark places.

It is morning and we should be up and in the field gathering the early crops and tilling and sowing for the mid-summer and later crops.

In the business world it is not only morning but a morning in springtime and the call to action is everywhere. True, in some remote corners strength, like peace, has not returned, but it is the privilege and duty of America, where truth and strength abide, to work, produce, distribute and build.

We are the source of supply physically, mentally and spiritually and we must not fail, and we need not fail if every man will turn his hand to the plow and take advantage of nature's gifts and her promise of a long summer and a bountiful harvest.

In the Automobile Business

In our own particular field, the automobile industry, of which we are a small part, the clarion call was sounded by the General Motors Corporation, which had the foresight and the courage to appropriate $37,000,000 for betterments and expansion.

Others have followed and, in a humble way, we are following because many years from now, when winter comes again, we shall not only wish to have sufficient to carry us through to the next spring but we shall desire to have so labored and so tilled our fields that we shall well deserve abundance.

In the automobile industry, due to the lack of supply for the past two years, it is an uncommon field which is to be cultivated; and the fine thing about it all is that in this field there are but few noxious weeds and the crop means to the people of our own good country, and other places of the world, good health and out of doors and cheerful minds and all the stimulus and uplift which the automobile will bring.

It is a sunny day for American business and for the automobile industry. Let us, therefore, proceed far afield with courage, for the land is smiling and only waiting to be cultivated to bring forth the best of fruits for ourselves and all mankind.

Olds Proposes Speedway for Large Cities

Many of the larger cities, perplexed for a solution of their traffic problems consequent upon the fast increasing use of motor cars, may see a solution in the plan proposed for Detroit by R. E. Olds, president of the Reo Motor Car Co. and a director of the National Automobile Chamber of Commerce.

The Plan as Applied to Detroit

As better and less costly than a subway which would seriously discommode business during its construction and only partly relieve the congestion by providing for foot passenger traffic only, he favors the building of a noiseless elevated line from Highland Park to Jefferson Avenue and then east and west on Jefferson three or four miles. On the elevated, between the sidewalk and the curb he would have fast moving street cars, gasoline propelled, with stations about every five blocks.

Adjoining this line, close to the curb at about half mile intervals, eight-foot inclines would give access to and from the lower level, alternate ones on the right hand of traffic would be for ascending and the intermediate ones for descending. Automobile passenger car traffic would have the middle of the structure as a speedway with a six-inch curb to divide the streams in opposite directions. Motor trucks and commercial vehicles would be excluded from the speedway, remaining on the ground level.

City Speed of Thirty Miles an Hour

With an allowed speed of thirty miles an hour the motorist from North Woodward could get down town in fifteen minutes, and in going out Jefferson Avenue could save at least a half an hour over the present time required by the delays and precaution necessary to take to avoid collisions at cross streets, to say nothing of the relief of nervous tension on the part of the driver. The plan would also protect the pedestrians and save them a great deal of time in crossing streets.

An advantage to business along the route would be the doubled display window space and additional entrance to the merchants' stores which would be reached by foot bridges from the street car sidewalk. Mr. Olds would have the street cars provided with rubber tires so that they would be practically noiseless. The structure being solely for passenger car traffic could be fairly light and scientifically constructed of either steel or concrete and would accomplish more than the subway to actually relieve conditions, without any of the underground system disadvantages of unhealthy and foul air and summer time discomfort.

New York to Have Uniform Railroad Crossing Warnings

The Youker bill, calling for uniform warning signs at railroad crossings, has been signed by the Governor of New York State and thus become a law. This was introduced and passed upon the request of the New York State Motor Federation's legislative committee. This warning sign is to be a circular metal disc thirty-four inches in diameter, with a white field and a black border line one inch wide and with black perpendicular and horizontal cross lines two and one-half inches wide with a black letter "R" five inches high in each of the upper quarters. It is to be installed on each side of the crossing at a distance of not less than three hundred feet.

Vehicular Tube Under Hudson River

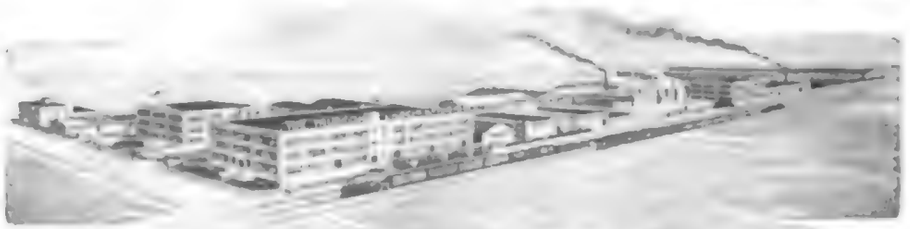
The Governors of New Jersey and New York have signed the bills authorizing that work be started at once on a tube under the Hudson River to be restricted to foot and vehicular traffic. It is stated that working plans will be drawn up without delay. It is estimated that the tube will cost $12,000,000 and will take from three to five years to build, and that within twenty years the tolls charged vehicles using it will have paid for its construction.

To Celebrate the Armistice

The Red Cross will need more money to meet the greater demand for relief next year. For this reason an appeal for funds will be made next fall to coincide with the anniversary of the armistice, so that the American people can show in a practical manner their thanksgiving for deliverance from the horrors which less fortunate peoples were unable to escape.

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

VII.—ELECTRICAL WORK—GENERAL

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

To many mechanics, the functioning and testing of the electrical system is more or less of a mystery. However, most of the work is based on simple rules and principles and requires but little equipment.

Testing the Storage Battery

When a car is brought in with a defective electrical system, the first thing to be examined is the storage battery. For until that is

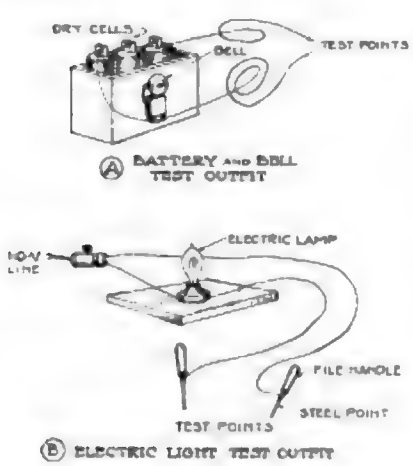


Fig. 1 Two common types of outfits used in simple electrical testing.

in good condition the rest of the system cannot be examined satisfactorily.

The following is a good battery test:

1. Turn all lights on, engine stopped.

2. Close motor starter switch.

3. Note lights. If bright, examine the battery terminals, and all connections, etc., to the starter. If lights grow dim, the battery is defective, and should be repaired and recharged, or a new one installed.

4. Take a hydrometer reading of the battery. If the reading is below 1.150, the battery will doubtless be too weak to turn the starter, although the lights will indicate a good battery condition. The battery fully charged should register from 1.275 to 1.280. The plates should be covered about one-half inch with solution, and distilled water should be added until such is the case.

Circuit Testing Outfits

In electrical work it is imperative that only one part of the system be tested at a time, and only one portion of that part adjusted or charged at a time. By this the results of adjustments and changes may be noted, and if no result is noted the parts should be replaced as found and the tests continued.

Two types of outfits are in common use for testing electrical circuits. The first is shown at (a) Fig. 1. It comprises a box, containing three dry cells connected in series. The connection from one side of the battery goes through an electric bell to a test point and from the other side of the battery direct to a test point. Bringing these two test points together completes the circuit, and the bell rings. This outfit is portable and quite satisfactory.

Fig. 1-B shows a testing outfit that may be connected to any electric light line. It is simply a lamp, mounted to a board through a socket, one side of the line going through the lamp to a test point, and the other connected to a test point direct. By bringing the two test points together the circuit is completed and the lamp lights.

Testing Electrical Circuits

With either outfit the method of testing is the same, only with the first the bell rings and shows when the circuit is completed and with the second the lamp lights.

There are three kinds of defective circuits—(a) Grounded circuit; (b) Open circuit; (c) short circuit. Single examples of each are shown in Fig. 2. All of these defects are more common in cars that have been in service a long time and are a result usually of deterioration of the insulation and abrasion.

It was stated that the first point to examine on an electrical system was the battery. This being O. K., if a spark can be obtained on attachment of the wires to the battery, with all switches open, a grounded or short circuit may be present. The former is most common in a one wire system. The following is the method of test of a grounded circuit:

1. Starting at the battery, disconnect both ends of the first wire.

2. Place a test point on the ends of this wire, seeing that no bare metal strikes the car frame, and place the other test point on the car frame. If the lamp lights, the wire is grounded.

3. Repeat this with each wire in the system, one by one, till the defective wire or part (motor, generator, switch, etc.) is found.

Broken Circuits

A perfect wire is shown by the lighting of the lamp when the test points are placed

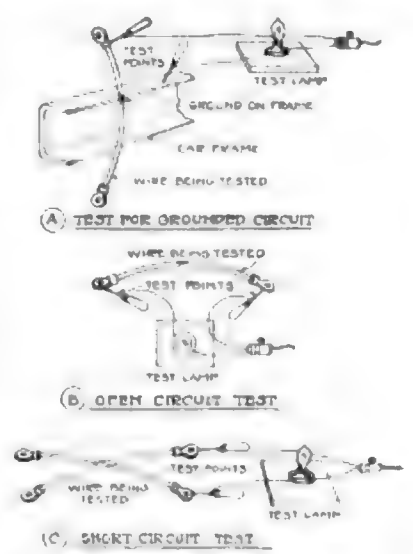


Fig. 2 Method of using test lamp for the three common wiring troubles

on its free ends. If the lamp does not light, the wire is broken. See (b), Fig. 2.

Short Circuits

Short circuits occur between two wires. The test is to remove all terminals of adjacent wires, and place the test point on the terminal of each two wires in succession. If the lamp lights, the wires are short-circuited.

In each case, if defective wires are found, new wires should be installed, though a repair may be effected by completing defective circuits and wrapping insulating tape over broken insulation.

The thing to remember in testing of this kind is to test not more than two wires at one time, and to replace these wires on the binding posts from which they were removed. One wire, incorrectly replaced, will introduce trouble that will baffle many me-

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chanics, and possibly cause injury to the system.

By following the simple rules outlined above, the mechanic can test out all sorts of electrical circuits—running condition tests on switches, armature windings, field coils, etc.

Testing Generators and Starting Motors

When mounted in the car, subject to many varying conditions and possibilities, it is not always easy to determine whether a starting motor or generator is operative or defective. The easiest way to find out is to remove it from the car, test it by itself, and find out.

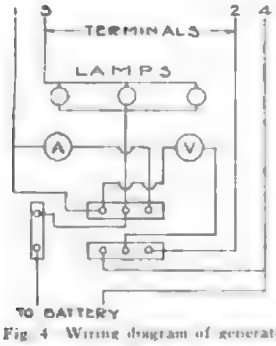


Fig. 4. Wiring diagram of generator test set-up.

This can most efficiently be done by means of an electrical testing bench as shown in Fig. 3. The bench is in two parts—generator test, and motor test.

Briefly, the method of testing the generator is to drive it from a variable speed motor at several speeds, and by duplicating the connections in the car on the bench, note the resulting action. A generator known to be in good condition should have been previously tested, and its operation noted, as a check.

The details and arrangements of the various parts are sufficiently shown for construction in Fig. 3, and the wiring diagram is shown in Fig. 4. A 15-volt reading voltmeter and a 25 amp. capacity ammeter should be mounted on the instrument board, and the wiring and switches should be of at least 15 amperes capacity.

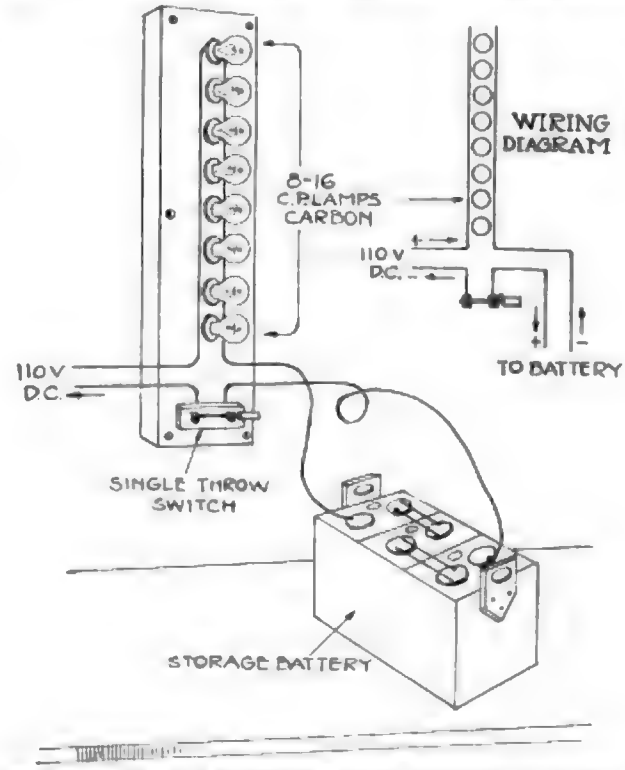


Fig. 5. Storage batteries may be charged from a direct current line by means of carbon lamp resistance connected as above.

Starting Motor Test

The starting motor test, likewise comprises removing the motor of the car, and duplicating its connections on the bench and noting the action under various loads.

A steel plate is bolted to the bench to serve as a base for the motor, and to act as a ground connection. To this the motor is

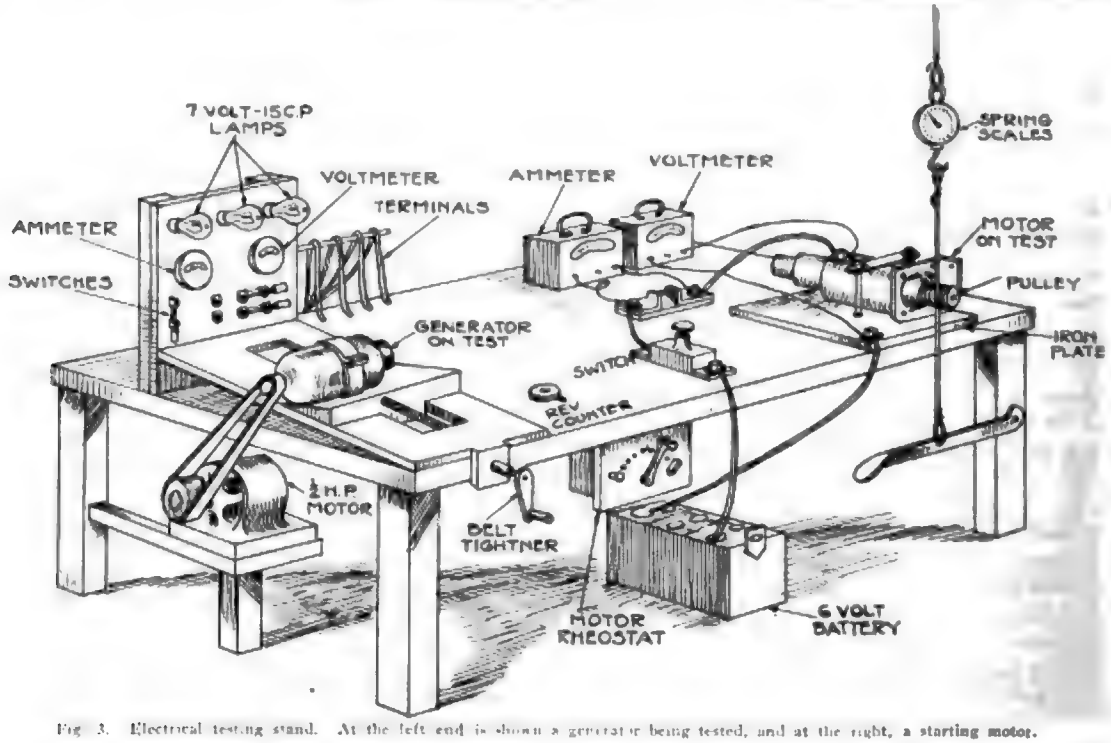


Fig. 3. Electrical testing stand. At the left end is shown a generator being tested, and at the right, a starting motor.

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clamped by means of steel bands. A storage battery fully charged is connected to the motor in the usual manner through a starting switch.

In order to duplicate the starting load, a rope brake is required. This consists of a 6 inch pulley mounted on the armature shaft, the braking load being applied by tightening a cord passed around it. A spring scale at the upper end measures the amount of load, which is applied through the pedal.

Instruments are required to measure the current consumed under various loads. A 15 volt scale voltmeter is satisfactory, and a 150 amp. capacity ammeter should be used. Both may be secured from any electrical supply house, and the purpose for which the instruments are desired should be stated, as special automobile test type instruments are usually provided.

Before applying any load, the circuit should be completed and the action of the starter noted; slow speed and high amperage will indicate friction in the bearings or short-circuited coils (armature or field). Low speed, with small current consumption indicates improperly set or defective brushes.

Load should be applied in one pound steps up to about six pounds, and the corresponding voltage, amperage and speed readings taken. These should be compared with similar reading taken on a motor known to be in good shape.

Charging Batteries from Direct Current

In many places 110 volt direct current is available, and when this is the case a simple charging outfit may be constructed. It consists of 8 carbon filament lamps, 16 candle power connected as shown in Fig. 5. Each lamp allows about one-half ampere, which is the normal charging rate for a battery.

The negative side of the line must be connected to the negative pole of the battery to be charged, and the positive to the positive. From 25 to 30 hours are required to fully recharge a battery, and this condition can be determined by a hydrometer.

Research Work in Steel

By Christian Girl, President Standard Parts Company, Cleveland.

"Probably less is known today about the heat treatment and hardening of steel of all kinds than about any other phase of the manufacture and use of steel. Many of the present methods are out of date and the cause of much loss to users of important steel parts. Good steel is being ruined daily by careless and inaccurate heat treatment. Many examples could be cited. The increasing number and importance of alloy steels is further complicating the situation.

"In view of the striking progress lately made, not only in pyrometric measurements but also in the control of temperature by electric, gas and oil-fired heating furnaces, the new movement for co-operation in applying the scientific method should yield large returns in increased certainty of results and in definite improvement of product."—Editorial, *Iron Age*, May 29, 1919.

Creation and production may often be miracles (that is, things to be wondered at) but need not continue to be mysteries—(that is, things incapable of solution).

Because some things seem to be incapable of solution it does not follow that they are, in fact, unyielding to chemistry and physics.

Certain combinations produce certain definite results. If in our ignorance we do not know the combination, or the basis of it, we should not be disappointed or peevish if, for such reason, we permit things to just happen.

The better way is to make them happen by knowing why they happen.

In 1907, the Perfection Spring Company, then only an infant of an inquiring turn of mind, began to poke its finger into the fires of investigation, wanting to know why one piece of spring steel came out hard and another soft—Why one piece required a longer time in the fire than did another piece—Why one spring failed in service while another stood up.

This infant often burned its fingers by poking them into heat treating investigations, but this was better than losing its meal ticket—that is, its customers, when its springs went wrong. A burnt finger is better than an empty stomach.

Continued investigation and analysis resolved the question down to four main points in spring construction, namely:

1. Chemical content and method of producing the raw steel.
2. Proper design of the spring structure
3. Proper heat treatment of the steel in process of spring manufacturing.
4. Correct machine practice in making the various parts of the spring.

Early Laboratory Work

I believe it was Lord Kelvin who said—"Things which can not be reduced to figures are not so." Working on this theory, so far as material things are concerned, the Perfection Spring Company caused a number of laboratories to undertake in its behalf chemical analyses of spring steel. Among those so employed were F. J. Peck, Crowell & Murray and Henry Souther.

From facts gained through a great many analyses this company was eventually able to specify the correct chemical proportions of the various elements in order to get spring steel, which, if treated and machined correctly, would make an excellent spring, provided that spring be correctly designed.

The next step was a laboratory of our own, work with and in which began in 1910 with full equipment for the determination of the chemical and physical properties of spring steel and its action under certain treatments.

We believe this was the first laboratory ever built by a spring company and employed exclusively as an aid to correct buying and correct manufacture.

Very many experiments in heat treating were made, and at costs running into many thousands of dollars, but by the process of elimination we evolved the correct formulæ for the heat treating of spring steel in order to produce the proper micro-photographic condition and the correct physical properties together with the most economical cost of production.

Another Important Step

The next step in these four corner-stones of good spring making that of correct mechanical design for a given place and purpose, also received attention at the same hands. In 1910 an engineer of national standing was employed and for two years it was his chief duty to reduce to a science, that is, classified knowledge, the highly specialized skill theretofore residing in the minds ialized skill theretofore residing in the minds of the few individuals who had learned to outguess the other fellow in designing springs.

After much patient effort on part of the most skilled brains that could be employed, the triangle theory of spring layout was evolved so that today, in The Standard Parts Company, girls can design springs which, barring physical inequalities in the steel coming to us from the steel mills, will, when the spring steel is shaped to such design, perform tricks which years ago would have seemed uncanny. The designers of such springs would have been placed in a class with the "witches" of Salem.

The fourth corner of the foundation we have named, namely, good machine shop practice, has been evolved by many other than ourselves. In fact we have drawn more from the world in material for this cornerstone than we have given; but in the first three, The Perfection Spring Co., now the Standard Parts Company, has stood pre-eminent and has led the way.

Having learned the lessons at a time when new skin on burnt fingers grew rapidly, as it does with children, we are, in our maturity, extending to every branch of our business the positive direction of heat treatment, effectually replacing the guessing system with full knowledge.

Heat treating problems in all our plants *yield absolutely* to definite facts, under a definite policy, with the result of a uniformity of method and a uniformity of product to the benefit of all consumers thereof.

Wouldn't you pay a quarter to buy your child a virtue? Buy a Thrift Stamp today and start him in the ways of intelligent economy.

The person who doesn't save goes without worth-while things today, and will go without them tomorrow. The person who saves has everything he needs today, and will have still more tomorrow. Buy War Savings Stamps.

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"Vehicle Monthly" Time Savers

"The Vehicle Monthly" will appreciate the receipt of any "Time Saver" made by its readers. A rough sketch and a short description are all that is necessary.

(This series of "Time Savers" was begun in February, 1919. Back numbers may be had from the publishers)

"Vehicle Monthly" Time Saver No. 31
TUBE TESTING TANK

Though the common method of testing tubes is by inflation and immersion in water, the tank used is usually inadequate. The tank illustrated will soon pay for itself in time saved. It comprises a cylindrical tank, mounted on a stand, having a central overflow outlet, and constantly fed from a tap on the water main. The whole tube may be immersed at one time and quickly tested. The constantly changing water is always clear, so that even the smallest leak may be quickly seen.—Pennsylvania Garage, Philadelphia, Pa.

"Vehicle Monthly" Time Saver No. 32
STUD REPLACING TOOL

Studs may be quickly and efficiently replaced without damage to the threads by means of a special tool. This tool is a round steel bar, tapped at one end to fit the stud, having a ball bearing at the base of the threads and fitted with a T-handle to facilitate turning. The ball locks the stud and permits it to be turned in without damage and permits the tool to be readily loosened and removed without disturbing the stud.—S. E. Barber, Canton, N. Y.

"Vehicle Monthly" Time Saver No. 33
STUD REMOVING TOOL

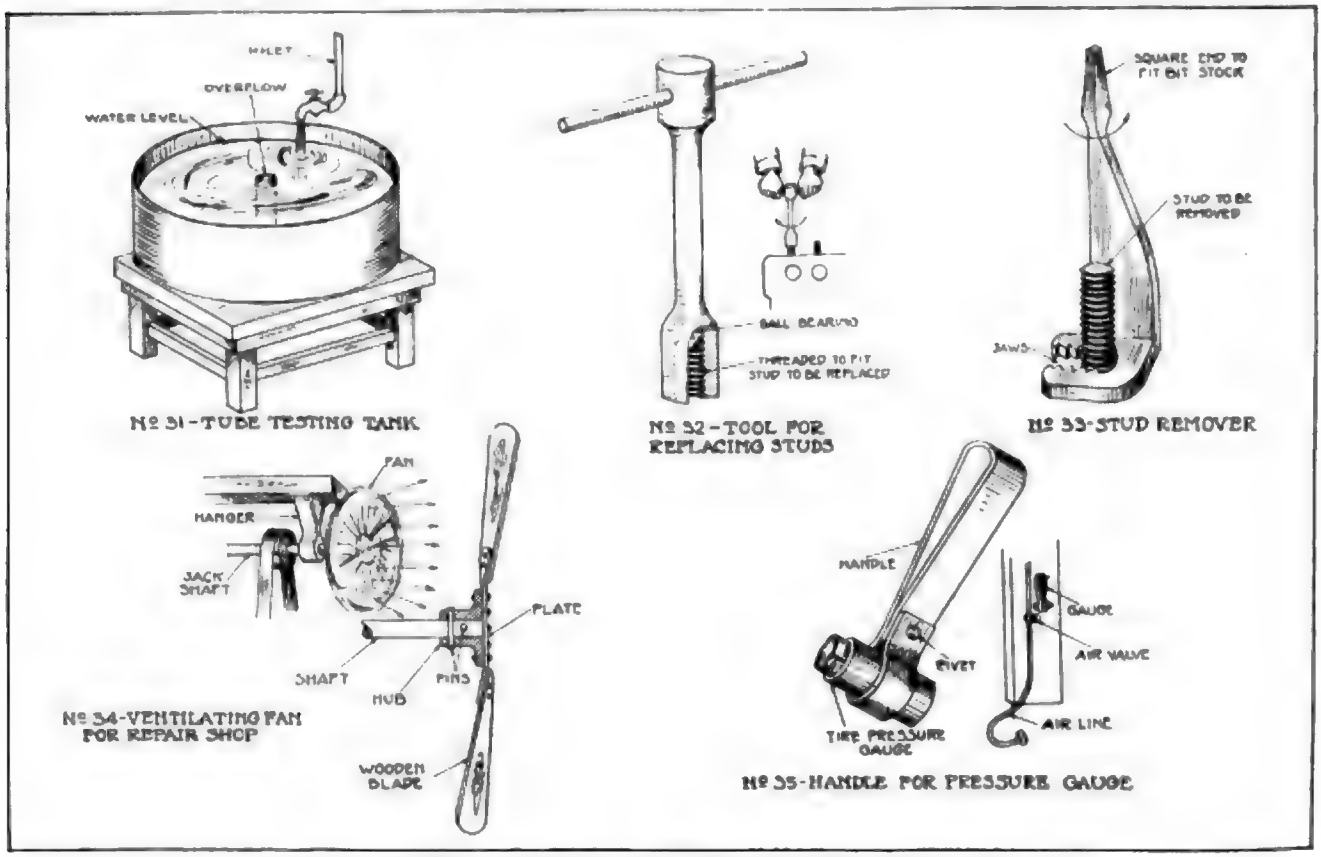
When it is necessary to remove old studs from a cylinder head, a pipe wrench is frequently used. But this is awkward and slow. A special tool as illustrated may be clamped in a bit brace and the stud quickly turned out. It is forged from flat steel soft stock, the jaws filed so as to "bite" on an unscrewing turn, and case-hardened.—S. E. Barber, Canton, N. Y.

"Vehicle Monthly" Time Saver No. 34
REPAIR SHOP VENTILATING FAN

Shops having an overhead power shaft or counter shaft in frequent use can keep the air circulating through the summer months by means of a wooden bladed fan fastened to a flange pinned to a shaft end. If the shaft is high speed, the fan should be small, and the blades metal, but if slow speed, larger and constructed as shown.

"Vehicle Monthly" Time Saver No. 35
TIRE PRESSURE GAUGE HANDLE

Many car owners, after borrowing the shop pressure gauge to test their tires when using the free air, will absent-mindedly carry it off, or misplace it. This can be prevented by fitting a strap iron handle as illustrated and riveting the handle in place. The handle prevents placing the gauge in the pocket, invites hanging up, and renders it more readily seen if misplaced.—S. Barber, Canton, N. Y.



"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ON THIS PAGE

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Rowe
THE PIONEER WORM-DRIVE TRUCK

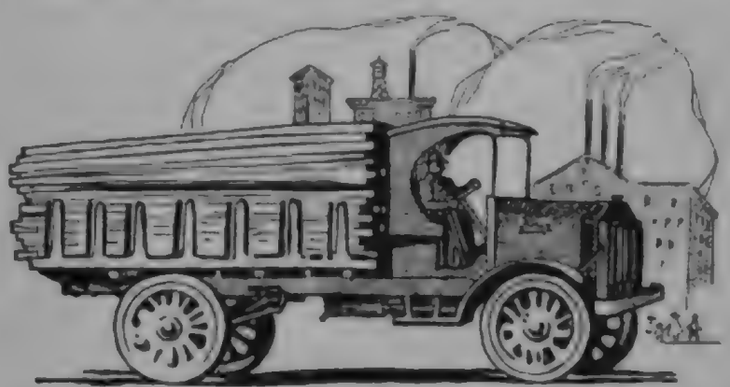


Strenuous Service

IN SOME parts of China to-day the strenuous method of transportation shown above is still employed. Contrast it with the up-to-date American method at bottom of page whereby one man and a Rowe Truck takes care of a load 20 to 30 times greater than can be handled by the four men in the upper illustration.

Furthermore, the Rowe Truck never tires. Unlike man power, it can perform strenuous service twenty-four hours a day, seven days a week if need be.

To its wonderful stamina, ease of handling, freedom from engine trouble, and almost unbelievable hill-climbing ability is due the remarkable success of the ***Rowe Truck,*** the ***Dealers' Business Builder.***



ROWE MOTOR COMPANY
LANCASTER, PA.

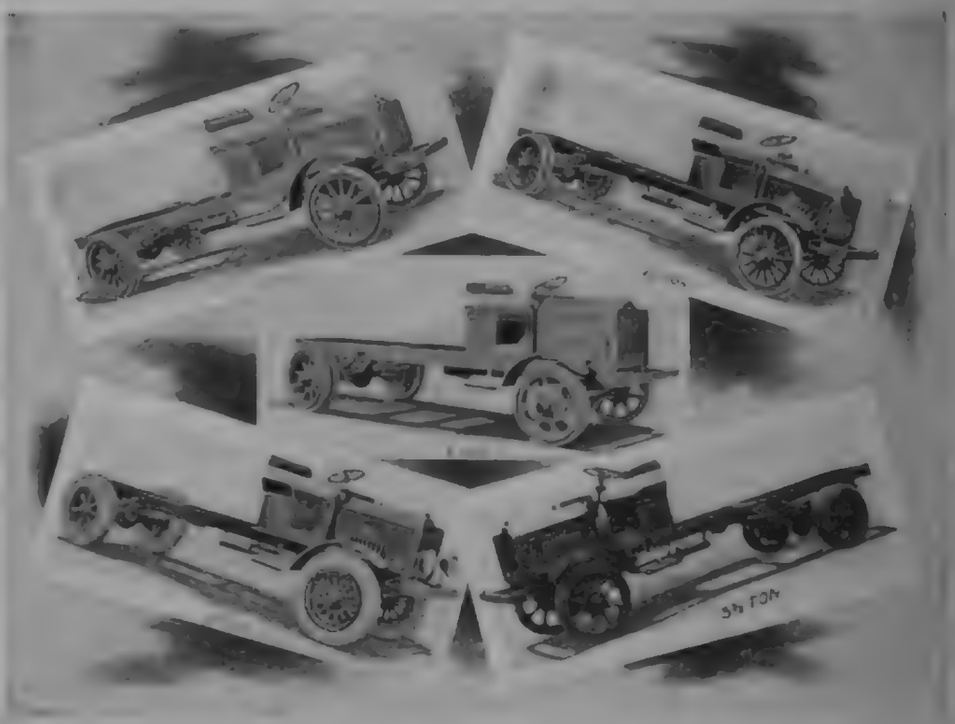
ROWE RUNS RIGHT ROWE RUNS RIGHT

Rowe

Rowe

The 5 Rowe Models

THAT FILL EVERY TRUCKING REQUIREMENT



Rowe dealers are never at a loss to please prospective customers in any line of business

Read the strong selling points on opposite page

ROWE MOTOR COMPANY

LANCASTER, PA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

The Essentials that Make the Rowe Run Right

UNITS OF NATIONALLY RECOGNIZED QUALITY

carefully assembled and rigidly tested before any truck leaves the Rowe factory.

ENGINE:—
On Pneumatic 3-Ton Model, 50 H. P. Herschell-Spillman. On other models, 4-Cylinder Wisconsin.

AXLES:—
Sheldon. Rear axle of housing type with David Brown worm gear. Worm special steel, heat treated, with hardened differential gears. Roller and ball bearings used throughout.

SPRINGS:—
Sheldon. Rear, semi-elliptic type, so slung as to minimize all road shocks.

STEERING GEAR:—
Ross. Irreversible, of the worm and nut type.

TRANSMISSION:—
Brown-Lipe. Four speeds forward and one reverse. Gears special triple heat treated.

IGNITION:—
Bosch high tension magneto.

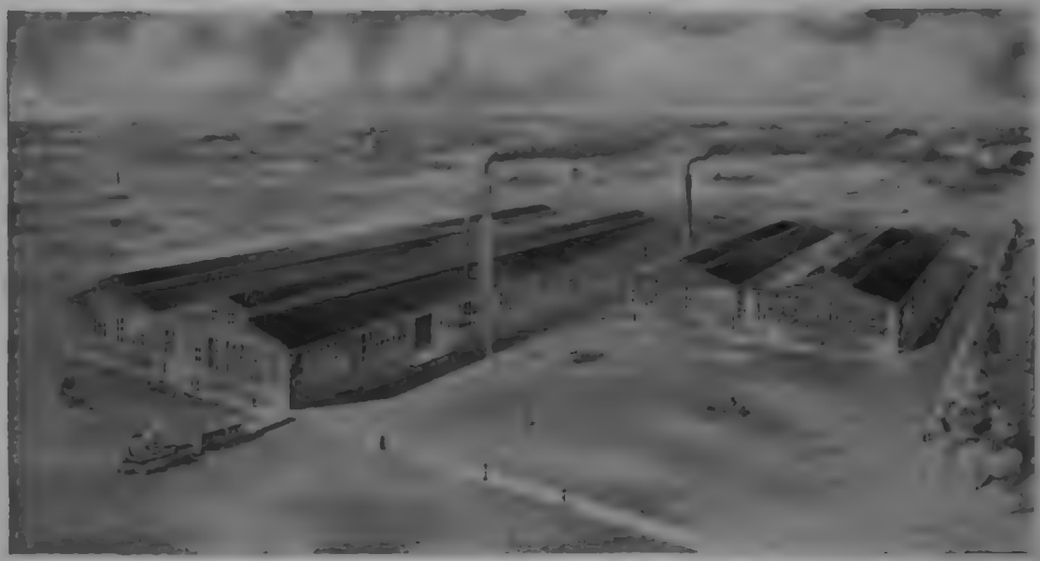
CARBURETOR:—
Zenith.

ROWE MOTOR COMPANY
LANCASTER, PA.

Rowe
THE PIONEER WORM-DRIVE TRUCK

CAPACITY DOUBLED

in Less than a Year



TO DOUBLE a plant in less than twelve months, shows that we have faith in Rowe Trucks. It proves we are not a "fly-by-night" concern. It is evidence that we want to back up Rowe dealers with better service.

Agents are needed for very excellent Eastern Territory.
Can we count on you?

ROWE MOTOR COMPANY

LANCASTER, PA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

Molding a Waterproof Plywood

By O. H. BASQUIN, Ph.D.

It is one thing to discover a waterproof glue. It is quite another problem, and a not less difficult one, to tell the business world of your discovery. Messrs. Haskell and Beiger accomplished the first, six years before the war, when they found the combination of glue now known as "Haskelite." The United States and its associated governments did the second when they put the practical stamp of approval on Haskelite glue, and the waterproof plywood into which that glue goes—approval which took the tangible form of large-scale orders for Haskelite for airplane construction.

When, years ago, Messrs. Haskell and Beiger started their experiments there were plenty of glues whose properties enabled them to resist casual moisture. Other glues had been demonstrated in trunks and signboards, where they might get an occasional wetting. Such a test seemed too tame to these men. They wanted to give a demonstratson that would make any business man take notice. They wanted to use this glue as an essential part of some article, not subject to occasional wetting, but an article that actually belongs in the water.

This explains why they chose to place a new canoe upon the market. Rowboats had already been made of sheet metal pressed and molded to form. They could easily make a plywood panel that would be large enough for an entire canoe, and they wondered whether such a panel could be molded to the form of a canoe. If it could be so molded, it was evident that this would furnish a demonstration of moldability as well as of waterproofness.

They boiled their plywood and bent it around steam pipes, and they molded it by pressing a small panel to the form given by the elbow of a very large steam pipe. By such simple tests they satisfied themselves that the material could be molded.

Early experiments in such pioneer construction are generally done on small models to indicate difficulties that may be encountered in the process, so that these difficulties may be successfully met in the later full-size constructions. Thus, Haskell and Beiger determined to begin with a model canoe of about one-third full size.

For this model canoe they made a cast iron male die of the desired form. They covered this die with waxed paper to a thickness of about one-eighth inch, and then cast a concrete female die from the male die thus enlarged. When the dies were used in molding the plywood panel occupied the space between the dies that was filled with wax paper in casting the female part.

Three-ply birch panels were used in making these 5-foot model canoes. The panels were glued up flat, boiled several hours to soften the wood, molded while hot, and left in the dies a long time to assume the form in initial drying.

The inventors were much encouraged when they saw how well their plywood assumed the complicated form of a canoe in their dies. The edges of the panel were so molded as to stand about four inches above the keel. The main surface of the canoe came out smooth, and, while small waves and wrinkles showed along the edges of the panel, these were so small that they were not judged as indicating any serious difficulty; and the model canoes were considered not only as successful, but as pointing to probable success in the extension of the same methods of manufacture to the full size canoe.

Preparations were now hastened for the manufacture of the large canoe. The male and female dies were made in substantially the same manner as before. To shorten the drying period after molding, the male die was provided with a heating system and a ventilating system was installed in the female die. This apparatus was mounted on a special press run by three hydraulic cylinders.

After all this preparation the edges of the molded shells came from the press badly covered with waves, wrinkles and folds. Mr. Beiger says, "they looked like some of Mr. Heinz's fifty-seven varieties that have been soaked in water instead of brine." Some of these shells were finished up for canoes, the wrinkled parts being cut off and replaced by shear streaks. These made satisfactory canoes, and they could be used to demonstrate the waterproofness of the material, but by this time the inventors had become interested in demonstrating that the material is moldable, and they were determined to make a full size canoe entirely of one sheet of plywood and without the use of shear streaks.

The wrinkles were formed along the edges of the plywood because the form adopted for the canoe required that each edge of the panel should be shorter in the molded form than in the flat form; it was necessary that these edges should become upset in the molding process, and since the edges were not so supported in molding as to prevent the formation of wrinkles, they formed in the early stages of molding and were pressed into folds when the dies closed.

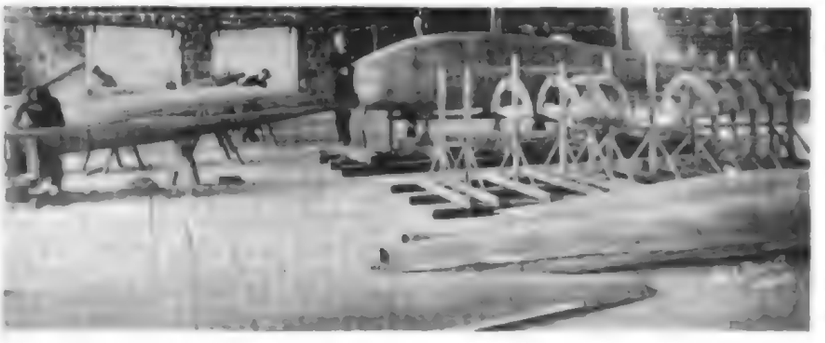
Molding must be accomplished, in general, by a single movement of a die, and the die must have a certain fixed form throughout the process. The panel that is being molded changes from a flat form to one of complicated curvature, and it is not an easy task to devise such a support for the edges of the panel that these edges may not become wrinkled in passing from the flat to the molded shape.

The inventors accomplished this end in an ingenious manner. A rounded metal edge was placed on the rim of the female die and the panel to be molded was lightly clamped to the face of the die. As the male die was elevated, the panel was pulled under this clamp and over the rounded edge, while the combination of clamp and rounded edge tended to keep the panel from wrinkling. The wrinkles that formed in their first large canoes were at right angles to the edges. In their modified process of molding, the plywood has a sharp curvature in passing over the rounded edge and this bend is at right angles to the direction in which the wrinkles due to upset tend to form.

Thus they used a temporary longitudinal wrinkle to prevent the formation of many transverse wrinkles, and in explaining how this acts, they illustrate it by saying that "a flat sheet of steel is easily bent, but if the sheet is corrugated, it is bent with great difficulty across the corrugations, and if it



Large Airplane Struts with Molded Haskelite Shells



Fuselages in Process of Construction at the Haskelite Plant

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bends the corrugations flatten out; in this new molding process the longitudinal curve along the edge cannot flatten out and hence wrinkles cannot form."

This modified molding process was a complete success, the molded shells came from the press practically smooth, shear streaks were no longer needed, and the canoe was a satisfactory commercial article and many



Haskelite molded fuselage mounted in a testing frame. Note the suspended platform to receive the pig iron piled at left of view.

of them were sold for practical uses. To carry the demonstration of waterproofness to the limit, one of the canoes was placed under water one fall and taken up again the next spring apparently in good condition.

In the above work it was found incidentally that the length of a plywood panel is inappreciably changed by prolonged boiling. To adjust the panel to its proper position in the press, two small pilot pins were placed about 13 feet apart on the keel line of the male dies. Holes to fit these pins were drilled in the dry panel, and it was found that if the distance between the holes in the dry panel was made the same as the distance between the pins, the holes and pins would still register after boiling the panel five or six hours.

In making these canoes it was customary to trim a flat panel before molding approximately to the outline that would be required to form the canoe. It is related that on many occasions measurements were made of the length of each side of the panel along this curved outline both before molding and again after molding, and that these measurements commonly differed by six or seven inches. Since this length was about sixteen feet, this indicates that an average upset of something like three per cent. was obtained in this molding process.

I had an opportunity to examine one of these canoes recently and I took occasion to study the upset. The width of the transverse face plies was measured near the keel and at points equally distant from the keel. The latter measurements were made near the gunwale and one both sides of the canoe. I found that the gunwale measurements averaged 1.9 per cent. smaller than the keel measurements. One face ply near the middle of the canoe indicated an upset of over four per cent., while two others showed an upset of two and one-third per cent.

Haskell and Beiger were right. The successful manufacture, sale and use of a plywood canoe promptly called the attention of business men to the remarkable properties of this glue and of the plywood made with it. The Haskelite Manufacturing Corporation was organized, and canoes were forgotten in an earnest endeavor to be of maximum service to the Government and to the Allies, particularly through the manufacture and molding of this plywood, now named Haskelite.

The Albatross was a German military airplane of considerable promise whose fuselage was constructed entirely of plywood. It was not molded from a single panel as the canoe had been, but it was made from many pieces, joined together at numerous longitudinal and transverse seams. A captured Albatross had been brought to this country.

The aircraft people had learned of the canoe molded from plywood. They were anxious to develop an American military plane with a plywood fuselage. It seemed quite probable that such a fuselage could be made whose strength would be as great as that for the standard construction, and whose weight would be smaller. Such a fuselage would be less subject to minor injuries in landing, the shell could not be easily torn in flight, the form would remain unchanged by air pressure in service, and repairs could be readily made to the shell.

In addition to the above advantages the Haskelite method of construction by moulding large panels offered particularly rapid and economical manufacture and assembly after the equipment had been secured. The company was urged to provide for such manufacture on a large scale and it was given a contract for a few experimental fuselages whose form should be determined by agreement with government officials. The company expedited this design work to the fullest extent, but it was surprised to find that the government officials appeared to be in no great hurry, and great delay was encountered in settling upon a design for the experimental fuselages.

In the meantime the Curtiss Company was developing a new military plane and wanted to try a molded Haskelite fuselage. In this case there was no doubt about the form of fuselage wanted. Although the order from the Curtiss Company was received later than that from the government, the equipment for the Curtiss molding had been designed, built, and a number of the molded shells made at about the date that the design for the government fuselages had been agreed upon.

In each of the above cases, the fuselages were made of four panels, a top, a bottom, and two sides, connected by longitudinal joints. One fuselage was about twenty feet long, and the other about twenty-five.

In molding these fuselages the methods used were similar to those developed in making canoes. The female die was not used, but an aluminum plate with a rounded edge was employed, representing the rounded metal rim of the female die of the canoe. Below this aluminum plate on each side of the press there was an adjustable plate with a Babbitt face. The boiled panel of Haskelite was placed between these two plates on each side of the press, and as the male die



Haskelite molded fuselage, broken by horizontal and vertical loads aggregating more than 10,000 pounds.

was elevated in molding, it pulled the panel inward between the two plates on each side. The action was thus to stretch the softened panel over the surface of the male die by

(Continued on page 18)

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BODY DEPARTMENT

VEHISOTE: Efficiency General Satisfaction Economy



VEHISOTE SIDE PANELS

Over 60,000 closed panel bodies with Vehisote side panels now in service, each speaking a good word for Vehisote.

Vehisote is not a substitute for wooden panels. It is a scientific and positive improvement over wood or any other material for the purpose.

It is as far ahead of the old-fashioned methods as gasoline or electric trucks are ahead of the horse-drawn wagon.

THE PANTASOTE CO. 11 Broadway NEW YORK — Peoples Gas Bldg. CHICAGO — Penobscot Bldg. DETROIT

JOBBERS

The Scovel Iron Store Co., San Francisco, Cal.
Sligo Iron Store Co., St. Louis, Mo.
E. D. Kimball & Co., Chicago
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C. H. Tiebout & Sons, Brooklyn, N. Y.
N. Langler & Sons, Brooklyn, N. Y.
H. D. Taylor & Co., Buffalo, N. Y.
W. E. Kleine & Co., New York City
H. Heit & Sons, New York City
W. T. Crane Cge. Hdwe. Co., Newark, N. J.
Gerhab & Ludlam, Philadelphia, Pa.
John C. Hills, Trenton, N. J.
Mossman-Yarnelle Co., Fort Wayne, Ind.
Wm. Stockhoff, Louisville, Ky.

Motor Bodies and Parts

Miniature Electric Brougham Body Fitted to a Standard Electric Chassis

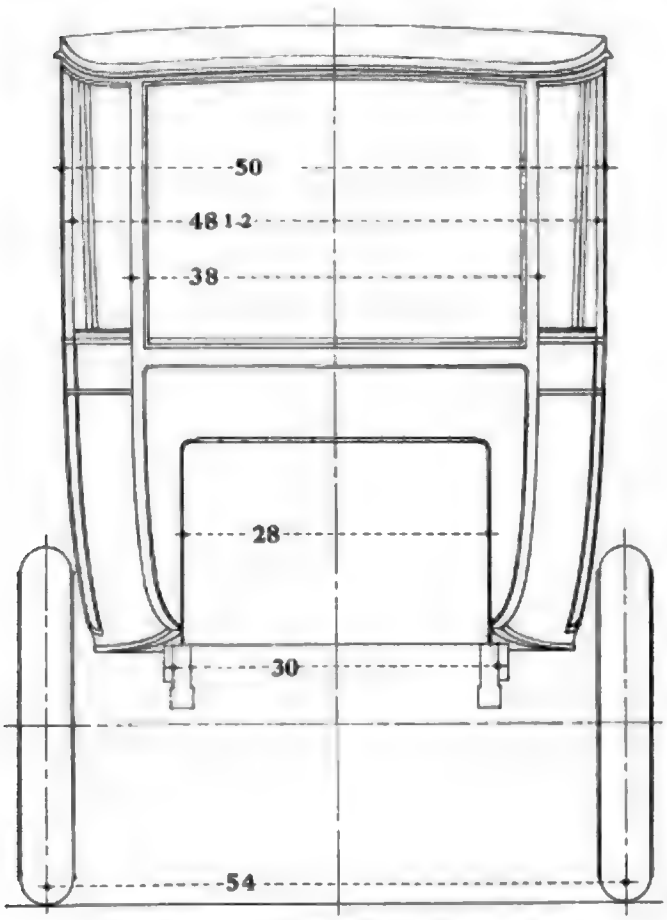
By CHARLES A. HEERGEIST

This standard chassis is 30 inches across front, 32 inches across rear part; top of frame, 24 inches from the floor line; diameter of wheels, front, 33 inches; rear, 36 inches.

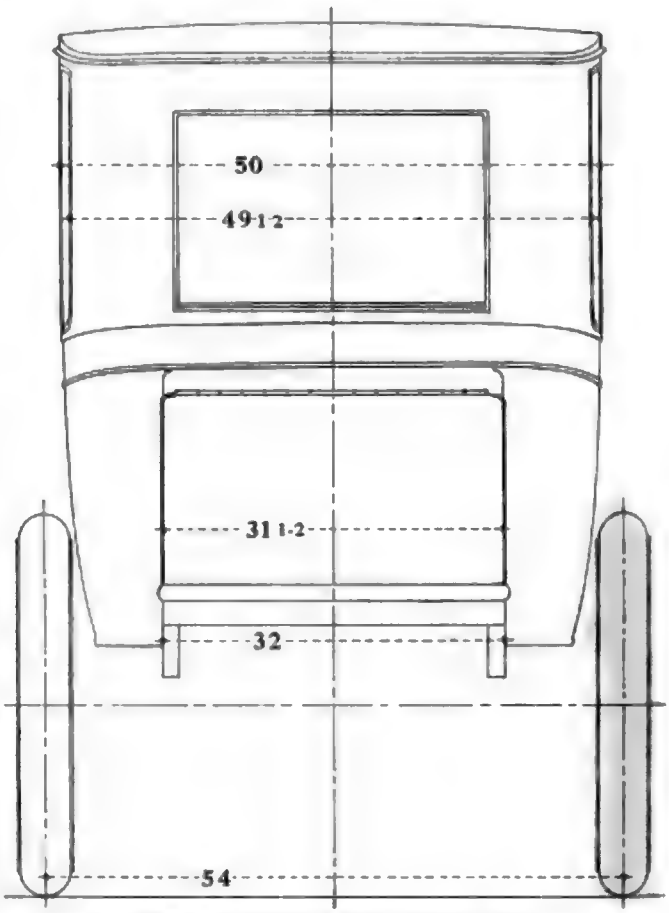
The length from rear surface of dash to center of rear axle is 81¼ inches; from rear surface of dash to rear end of frame, 97 inches; length of wheelbase, 98 inches.

The sizes of electric batteries, front and rear, are indicated on side elevation (under the hoods) and on half bottom view, and the views connected by dotted lines. The front battery is 13½ inches high from top of frame, and 24⅛ inches across the hood. The rear battery is 15 inches high from top of frame and 27¾ inches across the hood.

The body is to be of the shortest and narrowest type made. The length of cowl is 7⅝ inches; the extension of top 4⅛ inches; the length of front side quarter to front door joint, 15 inches; width of door, 24¾ inches. Length of side quarter from rear door joint to rear standing pillar, 19 inches; the rest of the side quarter, 6½ inches. The extreme height of body from top of frame is 57½ inches, and height of side quarters from top of frame 29 inches.



Front Elevation of Miniature Electric Brougham Body



Back Elevation of Miniature Electric Brougham Body.

Outside Widths of Body

Across front pillars, 38 inches; across front door pillar joints, 48½ inches; across door hinge pillar joints, 50 inches; and across front surface of rear standing pillar, 49½ inches. All these dimensions are incorporated into the side elevation, half back elevation and half bottom view. The cushions are shown in dotted lines in side elevation, including the dimensions.

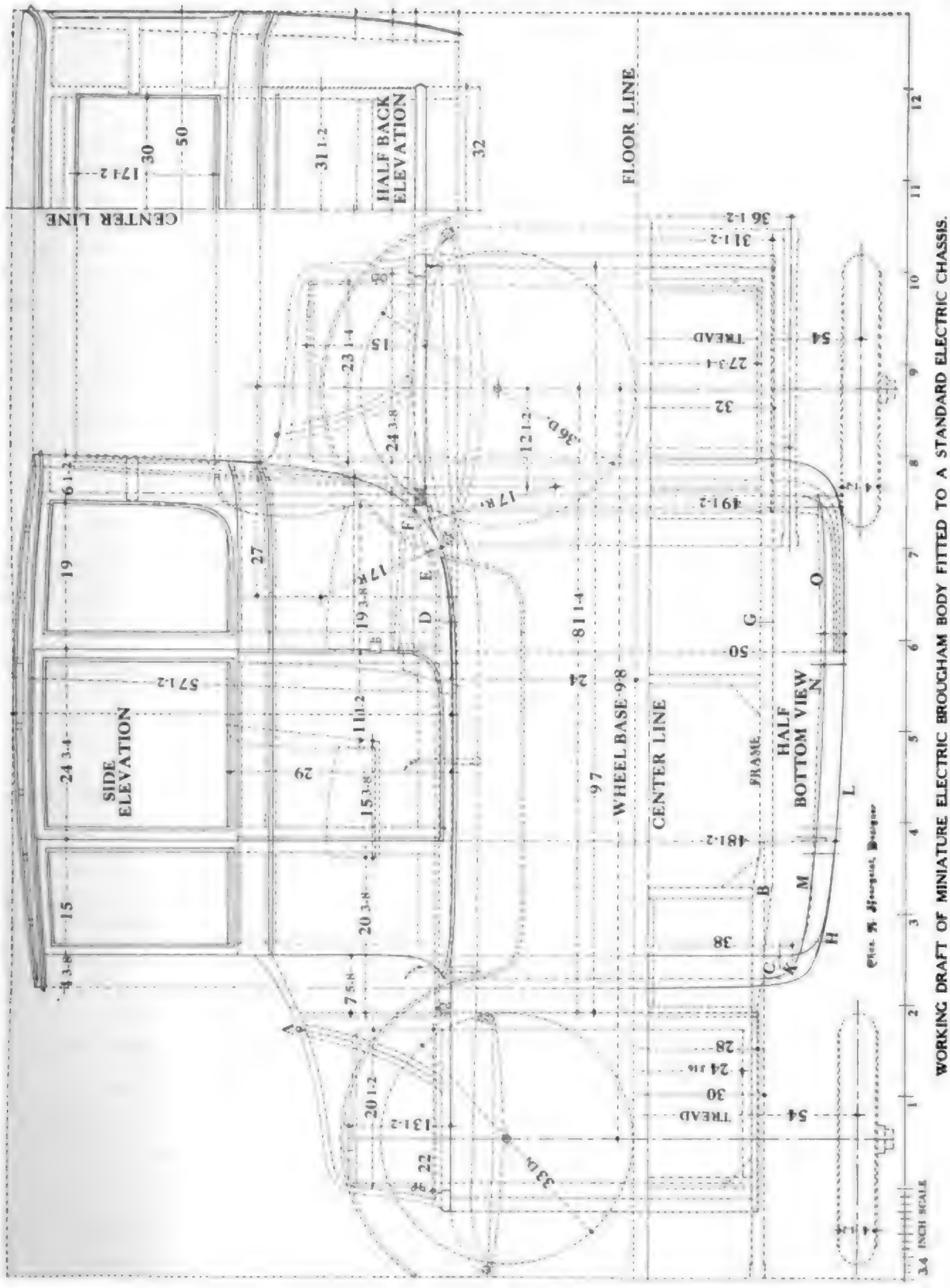
The Style and Construction of Body

The style of bodies fitted to electric chassis differs from those made for gasoline cars, because provision must be made for the batteries, front and rear, and the construction must meet the dimensions of the battery boxes. The entire length of the front battery is 22 inches, and the width is 24⅛ inches, as shown on side elevation and half bottom view.

This front can be altered in design and made similar to a gasoline hood except the front end, which must be made so that the battery box can be lifted in and out. On this front hood the entire front part is hinged on A, side elevation, and the rest of the hood and sill is framed to the cowl. The same is done with rear end hood, except there is no cowl. Front of hood is stationary and is framed to the body and sills.

The sills are shown by dotted lines on side elevation, indicating also the thickness

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WORKING DRAFT OF MINIATURE ELECTRIC BROUGHAM BODY FITTED TO A STANDARD ELECTRIC CHASSIS.

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of bottom boards up to rear end of seat. On this working draft the front hood sills, which are only 1⅜ inches deep and 1¼ inches across, rest on the frame when the body is mounted and are glued and screwed to the inside surface of main sill, as shown on joint B, half bottom view. This joint is indicated by a dotted line and is cut into the inside surface of main body rocker. The cowl part can be made straight, same as the rear end, which is less work, or it can be made concave, as shown by dotted line C, half bottom view.

The rear end hood sills are 1⅜ inches deep and 1¼ inches across, framed to the main body sills as shown on D, E, and F, side elevation. This hood sill is cut into the main body rocker same as the front one, except on this rear part there is a raise in the frame on which the main body rocker has to be pieced out to obtain the raise. To strengthen it, the hood sill is made in one piece from rear end to D, side elevation. The front joint of the hood sill is shown on G, half bottom view. The frame of the stationary hood part is very light, also the lid part, both front and rear, shown by dotted lines around the edges of the hood, but they are all supported by the standard frame.

The Laying Out of the Body

The body must be designed to fit the frame, and as the frame is short every quarter inch counts. The most important dimensions are the wheelbase, which is 88 inches; the space from front of dash to rear end of frame, which is 97 inches, and the space from front of dash to center of rear axle, which is 81¼ inches.

These three important dimensions are used for length of body from front of cowl to rear end of hood. The length of the wheelbase decides the length of the body proper, so that the rear wheels do not come in contact with the curved rear end panel, which space on this draft is 81¼ inches, just room enough to clear the body when loaded.

On a short body the position of seats is very important and at the same time decides the position of doors as on side elevation. The distance from front of dash to front edge of front seat is 20½ inches. The least distance allowable on gasoline automobiles is 24 inches with a low seat; but this seat is 10 inches high from top of frame to top of seat board, with a 6½ inch spring cushion. With this short leg room it makes a very comfortable seat. On electric cars the front seat must not be lower than as designed, because the foot lever is directly under it and the foot should not come in contact with the under part of seat.
but this depth can be increased toward the front 3 inches to support the legs, without interfering with the leg room. The space between the two seats is 11½ inches and the leg room is sufficient for comfort. The depth of rear cushion is 19¾ inches, and the height from footboard to top of cushion 14 inches, including a full spring back which makes an ideal and most comfortable seat to ride upon.

The width of doors is 24¼ inches, but the front seat blocks most of the entrance space, leaving 12 inches between end of seat and hinge standing pillar. The practice used to be on horsedrawn broughams to put the plain or concealed door hinges on the rear standing pillars, because it closed up the wheels and gave protection to ladies' dresses, but this is not the case of an automobile design.

On this draft the wheel is far away from the door, besides there is a large fender or mud-guard. Consequently there is no reason why the hinges should be on rear standing pillars. The entrance space is limited already on account of the front seat, and hingeing the door on the back pillars takes away at least three inches space which should be gained by hingeing the door to the front pillars with plain hinges. If plain hinges are used on front standing pillar the lower front corner of the door should be rounded same as the rear one. The Detroit Electric and also the Milburn have the door hinges on front standing pillars, but the Ratner R. & L. people put the door hinges on the rear standing pillars.

Generally the main body rockers rest upon and are on a line with the frame; on this working draft the rocker rests on the frame, but the part of rocker outside of the frame laps over the frame (that is below the top surface of frame), which can be seen by the dotted line on side elevation, representing the top of frame running through and above the door molding. The framing of both the hoods, front and rear, to the main body rockers has been explained above.

The thickness of the main body rocker without the lap is 2 inches, and with the lap 3 inches, and it is 9 inches across if the inside surface of body rocker is level with the inside of frame. It would save timber and labor if the lap was glued against the bottom surface of main body rocker, but it makes a bad joint through the molding. This may be avoided by gluing the molding over the joints.

Dressing the Standing and Door Pillars

The front standing pillars are dressed to shape, as shown by heavy and dotted lines on side elevation, and are 1½ inches thick. These pillars when made without the concave, same as the rear part, are 3½ inches thick, but the 2 inch thickness is glued on the pillars. On this working draft the cowl part is concave and the metal part is secured to the 1½ inch thick pillar. The rest of the front is curved from top to bottom, as indicated by H, half bottom view. Curved line H represents the top rail and fence rail, and curved line K, half bottom view, represents the extreme lower front of coupé pillar.

This curved front is the most difficult part of the body to construct, because the coupé pillar is concave on side elevation; the cowl is concave; the pillar rests against it, and the two curves H and K, must be incorporated with the rest. If the shape of the coupé were straight, cutting away the coupé pillar point on side elevation would simplify the construction.

The front door standing pillars are dressed straight across and beveled after the outside body curve L; dressed inside after contracted line M. The four door pillars are dressed after outside body curve L, and contracted line N. The two rear standing pillars are dressed after outside curve L, and contracted line O. The top rails and the rest of the pieces are dressed square and framed as usual.

The object in electric cars is to build the bodies very light, and where weight can be saved without lessening its carrying capacity and durability an effort is made to save it. The weight of the batteries does not interfere with the carrying capacity of the body, as they are placed directly over the springs and centers of axles, except in front where the battery is placed somewhat back of axle.

The curved front windows are stationary and are fitted in place from the outside; the back window glass has a metal frame and is raised by hand. The rest of the four glasses are raised by mechanical means, for which complete illustration can be found in past numbers of THE VEHICLE MONTHLY.

Parts Furnished with a Standard Electric Chassis

A standard electric chassis consists of the following parts:

Running gear (frame); motor, battery cradle box; driving and control mechanism and wiring, with all essential parts, fittings and protective housings thereof, assembled complete ready for operation on the road, with the exception of battery. A priming coat of lead on all parts to be painted, and as minimum equipment, a set of tires attached to wheels; pair of front lights; one tail lamp, with necessary wiring installed. License brackets; charging block and cable; odometer; warning signal; a set of tools commonly used for making adjustments and minor repairs on the road.

High-Grade Body Designer Wanted

One of the best known manufacturers of automobiles in the United States requires an expert and practical designer of high-grade automobile bodies to take complete charge of a body department which is to be one of the finest equipped plants in this country. This man must be an able designer of fine bodies—both open and closed—and have a thorough and practical experience in charge of design. For the name of the company refer to a special advertisement on page 68 of this issue of THE VEHICLE MONTHLY.

Bossert Corporation's Cleveland Office

The Bossert Corporation, Utica, N. Y., manufacturers of sheet metal stampings, have opened an office in Cleveland, Ohio, at 611 Citizens' Building. This office is in charge of W. W. Vesy, western sales manager of The Bossert Corporation.

By saving nickels and dimes a thrifty person lays the foundation of a fortune."—*James A. Garfield*. Remember, 16 Thrift Stamps, plus a few cents, are exchangable for a War Savings Stamp.

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The Design and Manufacture of Truck Bodies

BY EDMUND B. NEIL

Assistant Engineer, Truck Dept., Pierce Arrow Motor Car Co., Buffalo, N. Y.

The purpose of this article is to describe in general the development of the design and manufacture of truck bodies on both a "custom" basis as well as in large quantities of single types, and will include the methods previously used and the latest practices in the building of practically all types of bodies both wood and steel, as carried out by a large automobile concern manufacturing only the highest class of equipment for trucks.

It is not intended that the methods here outlined are the only ones to be used or that they are the proper ones to use in all cases, but rather to show what has been done, the reasons that such methods have been discarded, and to state those which have been found satisfactory with the hope that they may be of service in the solution of the problems of body builders, both those manufacturing a small number as well as those producing bodies in large quantities.

Formerly when a wood truck body was to be built, the body designer (who was also often the builder) would make up a rough sketch showing in general the appearance of the body, together with a few essential chassis dimensions (sometimes even the sketch was omitted) turn these over to his men and leave the rest to their knowledge and judgment. (Fig. 1) This method had two faults. First it was difficult to reproduce this body in every detail if a similar one was desired, and, secondly, it required that the body builders and assemblers have a good knowledge of truck body and coach work as the sizes of various members and parts were left to their judgment for proper insurance of strength and utility. From a manufacturing standpoint both of these faults are serious, particularly the former, as will be shown. The latter is fast becoming so because such men are hard to secure, and when they are they are loathe to give up their initiative in body work and object to having (as they think) their ideas curbed and being bound down to a system. If they could realize that such is really not the case and that they can be of immense help if their ideas are properly submitted, body building in many large shops would be much easier than it is. Credit is always given for good ideas and suggestions properly brought to the attention of the body engineer.

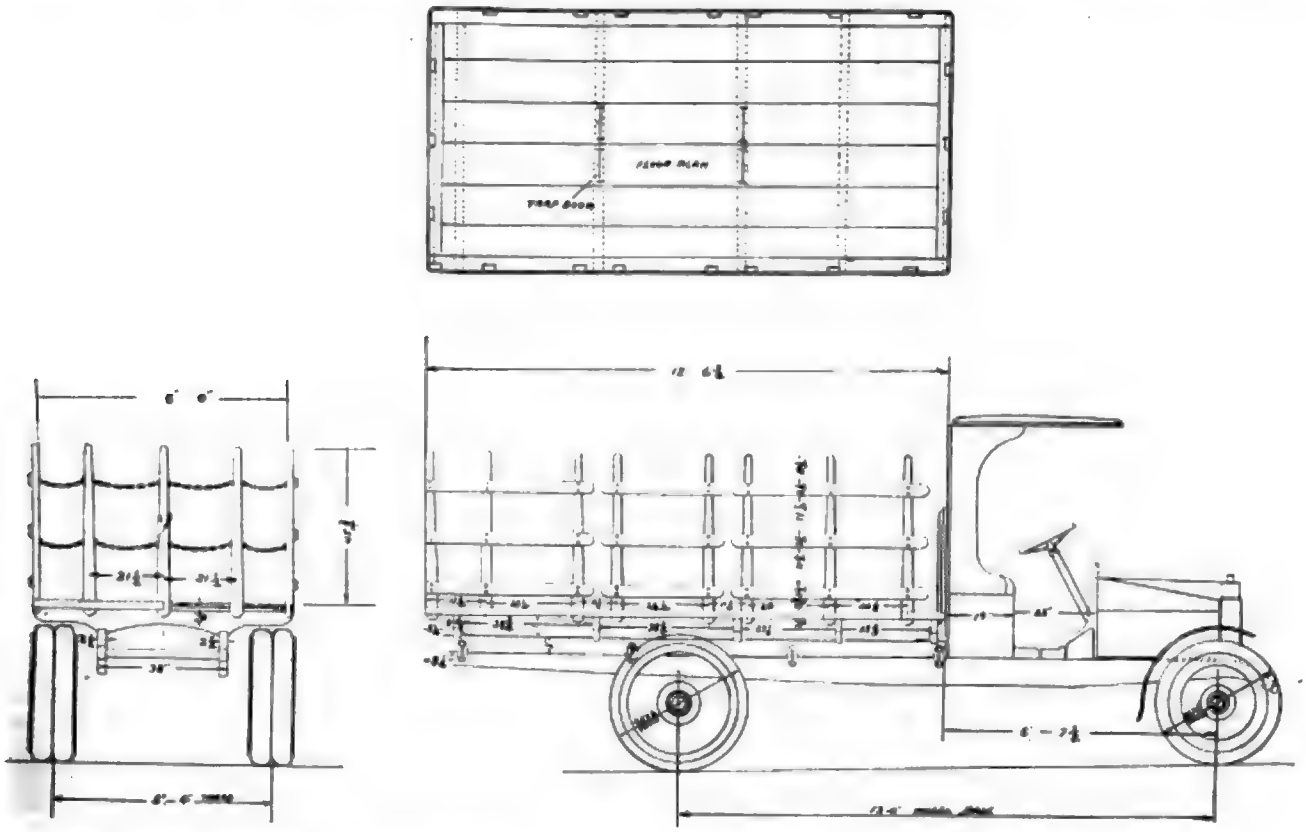


Fig. 1 Drawing represents first method of making body drawing under personal supervision of body designer. (Used with overall dimensions only as the "Arrangement on Chassis" for customers.)

The next step in the design of bodies came in the drawing room where the desire to eliminate the former of the two previously named defects arose. Previously so much depended upon a man's memory that many customers received a "duplicate" body differing in many features from the one he had previously received. A reduced scale drawing was made of each body to be built, showing the location of all stakes, irons and other parts, their sizes and lengths, including a bill of material covering all wood and metal parts with the exact *sizes* and *lengths* of bolts needed. (Figs. 2 and 3). The omission of bolt sizes, it might be added, is a common fault of most body drawings, as viewed from the standpoint of the manufacturer. These drawings required from several days to a week to make, and needed ex-

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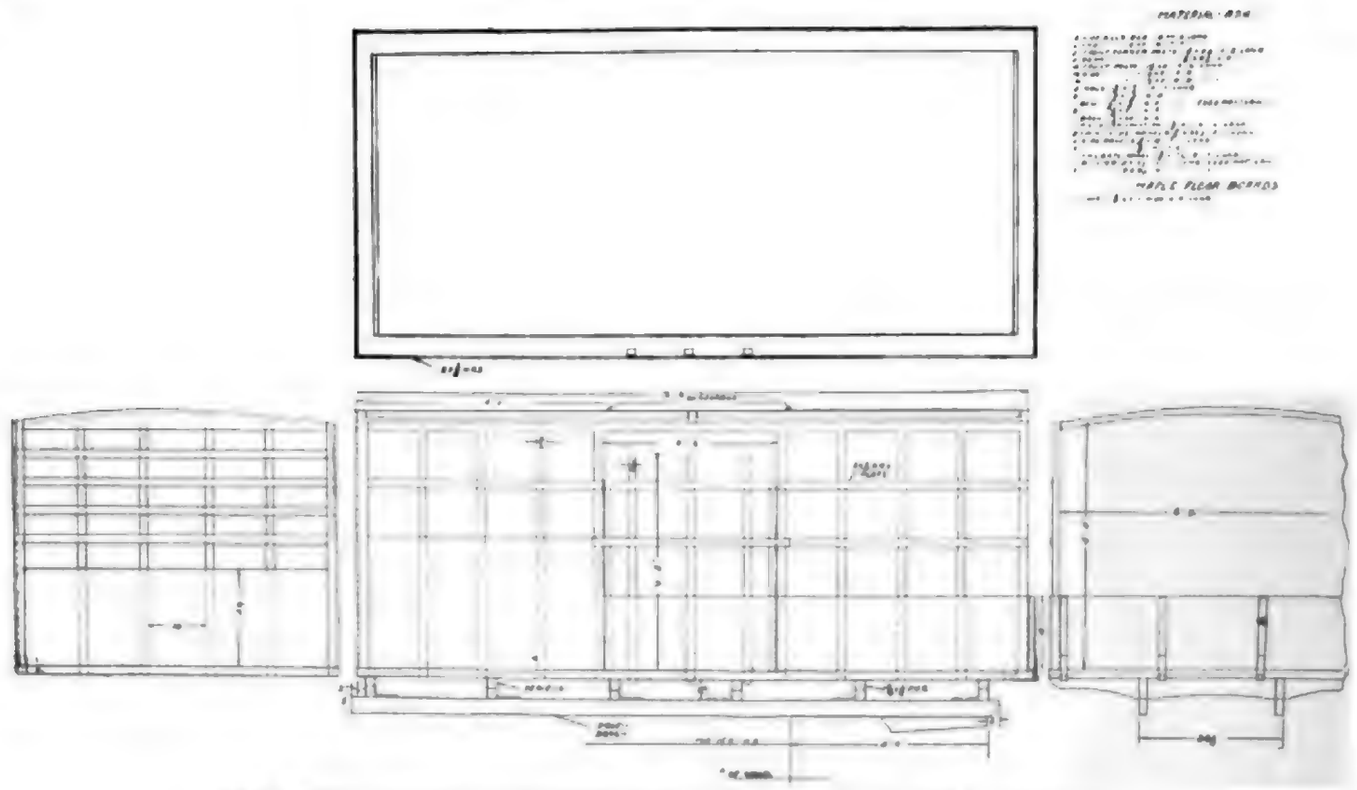


Fig. 2. Drawing represents use of a detailed working drawing with bill of wood material, but no bolts shown.

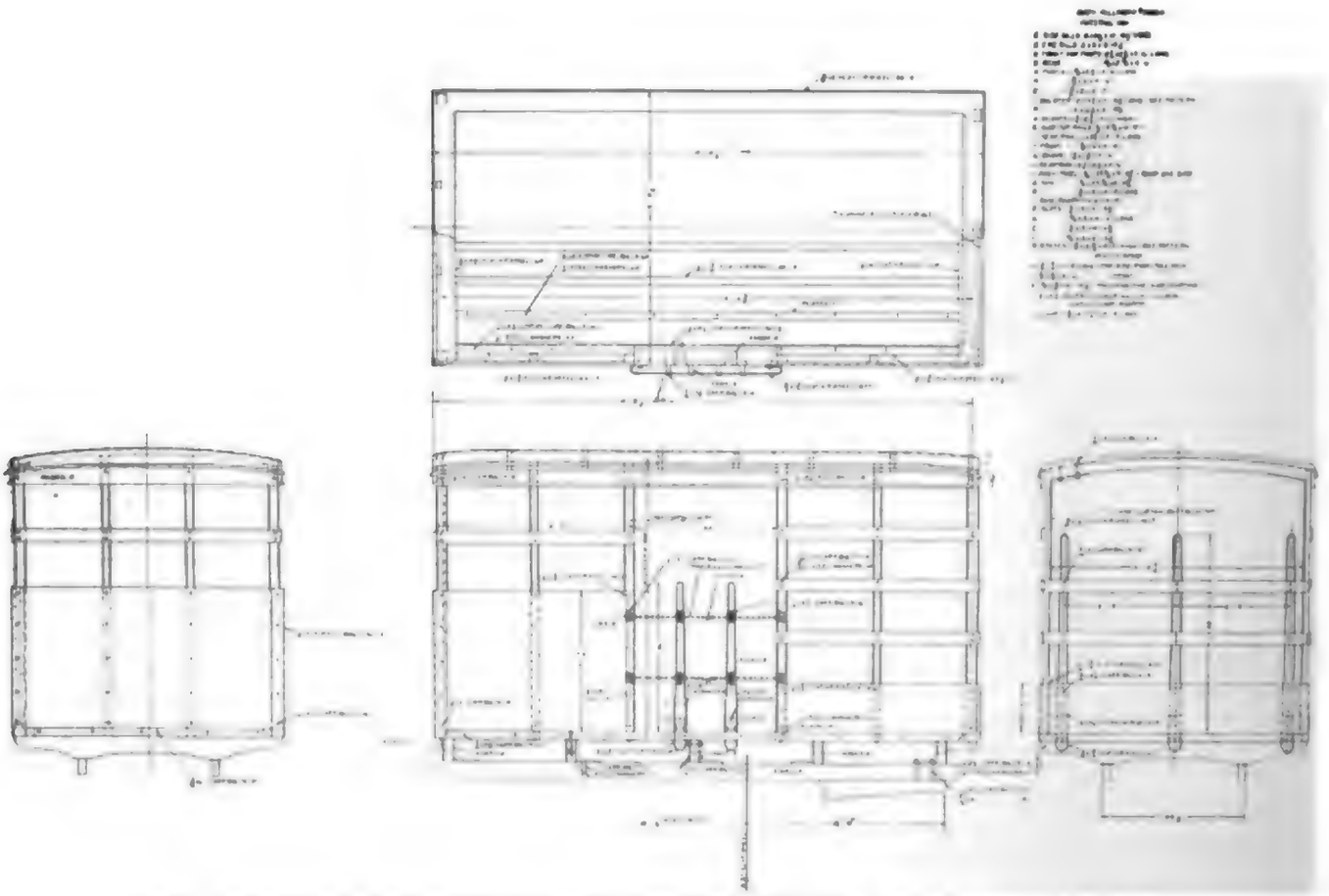


Fig. 3. Drawing represents later form showing bill of material, both wood and metal, with all hardware and bolts shown. Used where from one to ten bodies are to be built from drawing.

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pert draftsmen, but the reduction of shop delays and questions amply repaid the time spent on the original design. These drawings are always open to the criticism of the shop men and frequent reports were received when this method was first adopted. If any change was made a new blue print was sent out with the notice of such change. This in itself was an acknowledgment that the man's idea was thought good and accepted and a space "Suggested by" was properly filled out on the "Change Card." This method with various changes and improvements is in use today, and, as before mentioned, is used when a few (say up to ten or fifteen) bodies

duplicate the wood parts by means of patterns or templates, but all metal parts must be made exactly to size with holes drilled, etc., and the proper "fixtures" made to mount each part in precisely the same position on each body, so that a side or tailgate from one body will drop into position with no fitting on another platform. In other words, all parts must be made interchangeable in the same way as truck chassis parts are so made.

It is therefore essential that a drawing of each individual piece making up the body, including all wood parts, be made, showing all necessary dimensions and location of holes, etc. An assembly or arrangement drawing

On these detail drawings proper allowance must be made for wood expansion or shrinkage and limits placed on dimensions affecting a fit with another part. Slotted holes in metal parts often become necessary and wood parts must be accurately gauged as to size and length. Such drawings may require several weeks to a month to complete, but when once done work in the shop can proceed at a rapid rate and to a large extent the skilled hand can be eliminated in assembly.

An "experimental" or sample body is usually made at first in order to properly check the work and from which to make up the necessary patterns, templates and fixtures

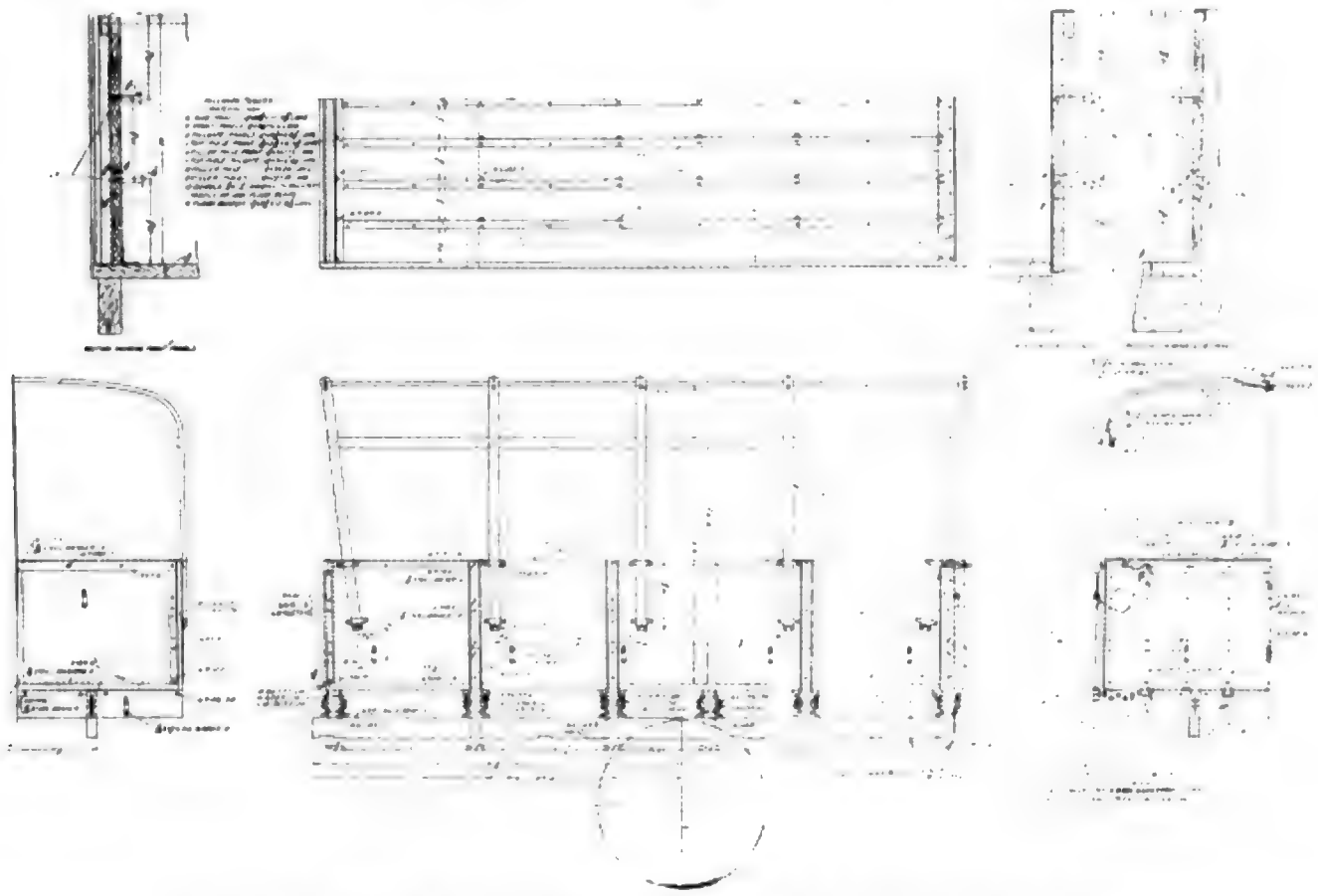


Fig. 4. Drawing represents the Class B, U. S. Government body, drawn up for production, using present methods.

are to be built. It is still open to the defect that it requires nearly the same skill in assembling as before, a condition which cannot exist to any large extent in quantity manufacture. These drawings are made usually with a scale of 1½" = 1 foot, and are ordinarily not allowed to be sent out of the factory, since they are equivalent to an actual scale drawing of a truck chassis. To fill this want a separate set of drawings termed the "Arrangement on Chassis" are made (to a ¼" = 1 foot) scale showing the body mounted on the truck and noting any special features of design or construction.

In considering the drawings for large duplicate orders several points of interest arise. Each body cannot be built from the "ground up" and it is necessary not only to

must be made giving the numbers of these parts and showing their exact location. Large layout drawings preferably to a larger scale than used (3" = 1 foot) must be made (in order to eliminate bolt and ironing interferences) from which the detail part drawings are made. The recent U. S. Government A and B body drawings are a splendid example of this type of work, although possessing the disadvantage (from a manufacturing standpoint as before remarked) of not giving bolt lengths or quantities required, and also that they show more than one piece on the same tracing. However, they show that much time and labor have been spent in the work and are excellent drawings to work from in making up detail drawings for production manufacture. (Figs. 4, 5 and 6).

It is here that the skilled coach builder is needed, for upon his experience depends much on the easy assembly of the body later He must understand drawings and shop methods and work with the designing department to have all work correct to the slightest detail before thousands of parts are made. He should be responsible for all such work and report errors or difficulties in assembly to the body engineer.

While the foregoing applies directly to the wood truck body, the latter method of using detail drawings for each part applies as well to the wood and steel truck body. The drawings are detailed in the same manner that those for the wood production bodies are made, all rivets as well as the various steel plates and angles, etc., which are in-

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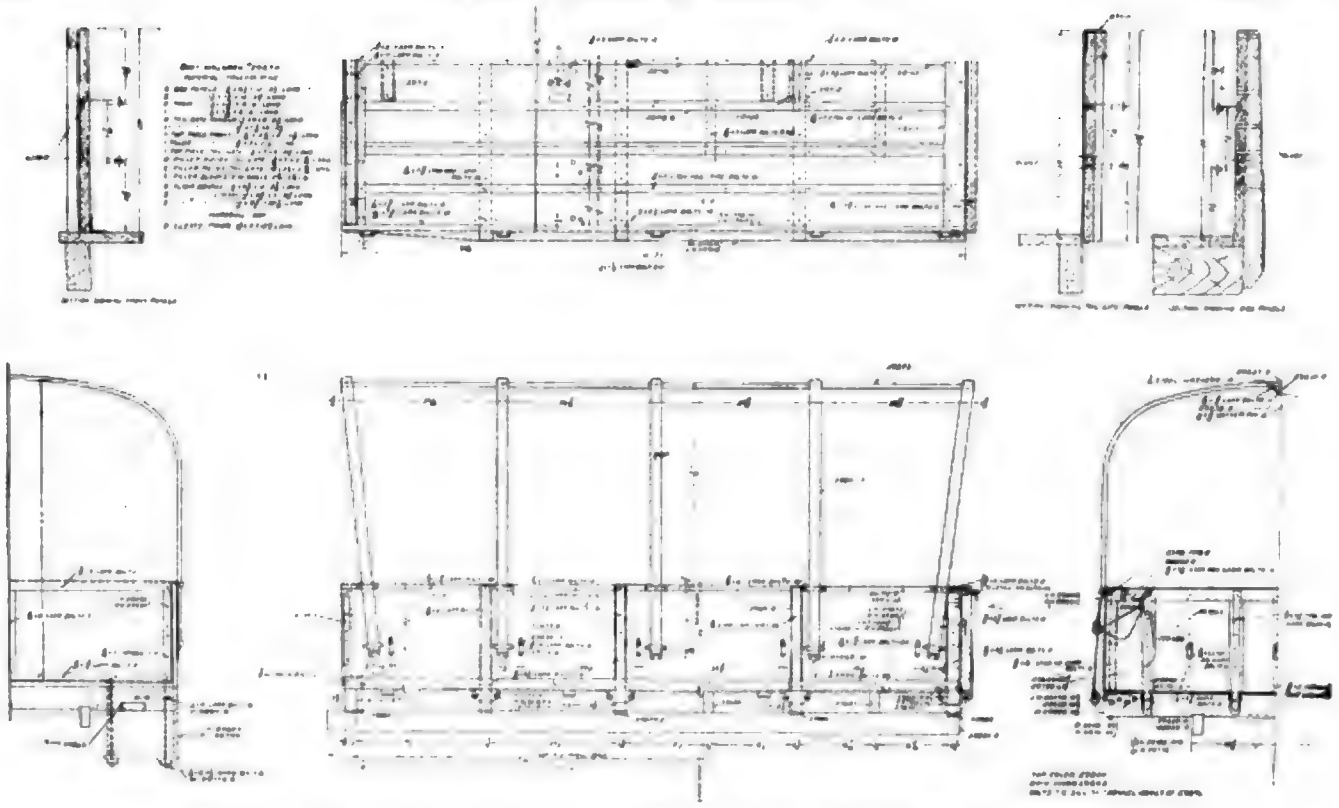


Fig. 5. Drawing represents a transport body similar to the Class B, of which 1,000 are to be made

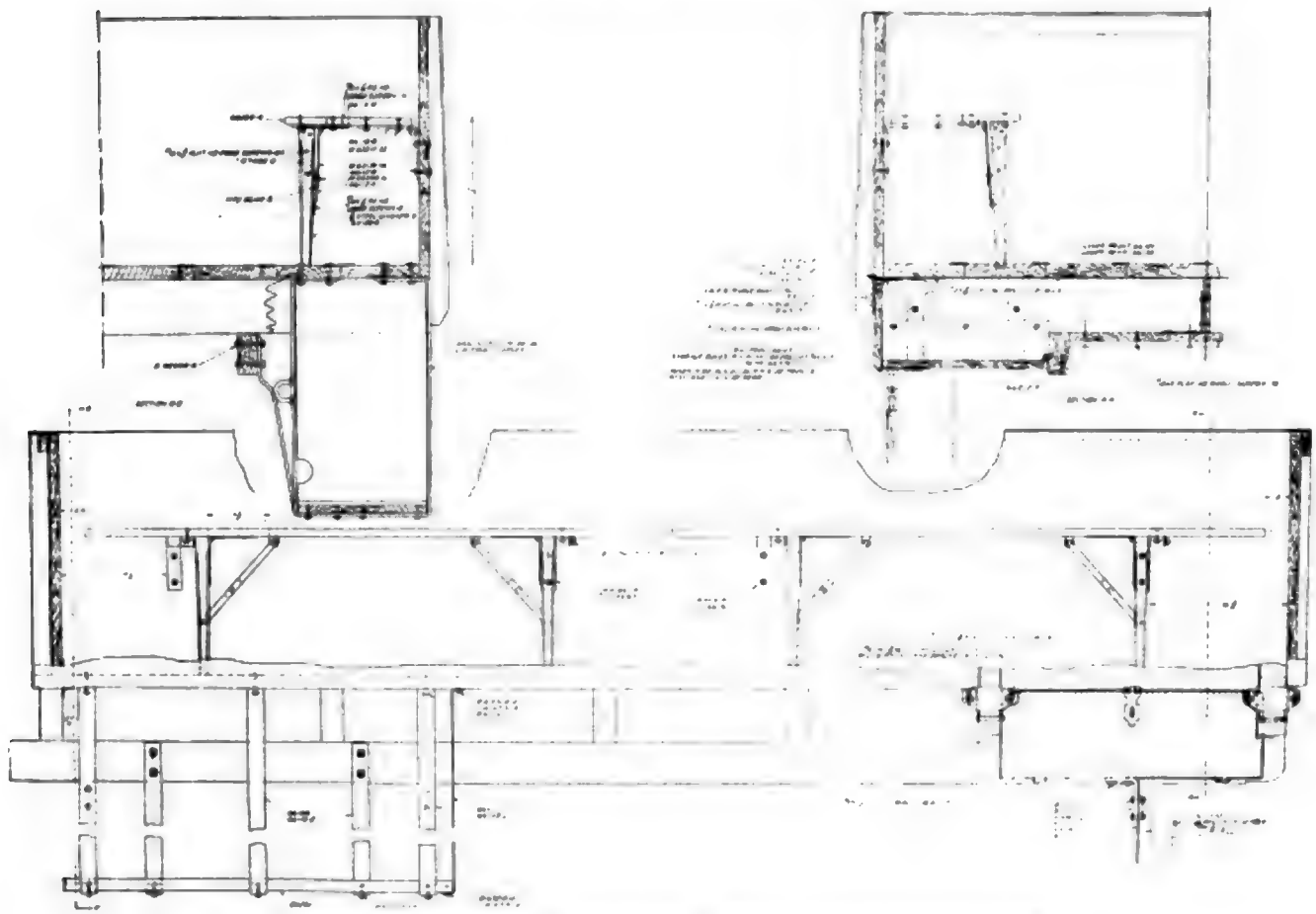


Fig. 6. Drawing shows the manner of arranging the seats and other equipment for body in upper drawing.

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cluded in the construction being called for by their members. It is seldom necessary to make up an experimental body since the material can be more accurately worked and the variations due to expansion or other changes are not of importance. (Fig. 7).

This, of course, does not mean that a body is not carefully tried out in service before being marketed, but to a specially built body to prove that the assembly and detail drawings are correct to the most minute detail, as is required for the wood body. Different styles of tailgates may be mounted on the same body since these units are interchangeable and many different styles of bodies may be made up from these standardized body parts to suit the customer's requirements.

To sum up in a general way, more time spent in drafting and design, and a reasonable amount of standardization will be amply repaid by more rapid manufacture, fewer mistakes and questions, decreased cost, and satisfaction both for the maker as well as the customer.

Post-War Models of British Cars

The following item relating to post-war conditions in the British motor-vehicle industry is taken from the Morning Post of May 17:

"It must now be accepted as a fact that as regards the world's motor industry as a whole we shall not see genuine post-war car designs on the market until the Paris show in October and that in London next November. A maker here and there promises to give deliveries in a month or two of fresh designs, but the output is as nothing compared either with the sum of current manufacturing activity or the demand for cars on the part of the public.

"As regards the European industry, the outbreak of war found it immeasurably ahead of the American in design, even as the American industry was far ahead of it in solving the thousand and one problems of production. In the interval America has passed the stage of design which Europe had reached in August, 1914, so that there can be no going back to what we were doing at that period, for the scale of American production under peace conditions exceeds 2,000,000 motor vehicles a year.

"We have therefore to incorporate in our new models all that has been learned in war experience bearing on the subject, all that our inventive talent can evolve to supplement that, and we have to lead in entirely fresh directions and achieve some miracles in manufacturing processes to enable this country to produce salable motor vehicles for disposal in the same markets as American and other foreign-built cars."

Trailer News

The Trailmobile Co., Cincinnati, is bringing out several new models of its trailers. New factories are being erected at Oakley, Ohio.

* * *

The Globe Improvement Co., of Buffalo, N. Y., plans to begin manufacturing semi-trailers on a large scale in the near future and to be in the front line with other trailer manufacturers.

* * *

The Martin Rocking Fifth Wheel Co., Springfield, Mass., has built some new models of two-wheeled trailers designed to run exactly in the track of the rear wheels of the towing vehicle and to have no side sway at high speed.

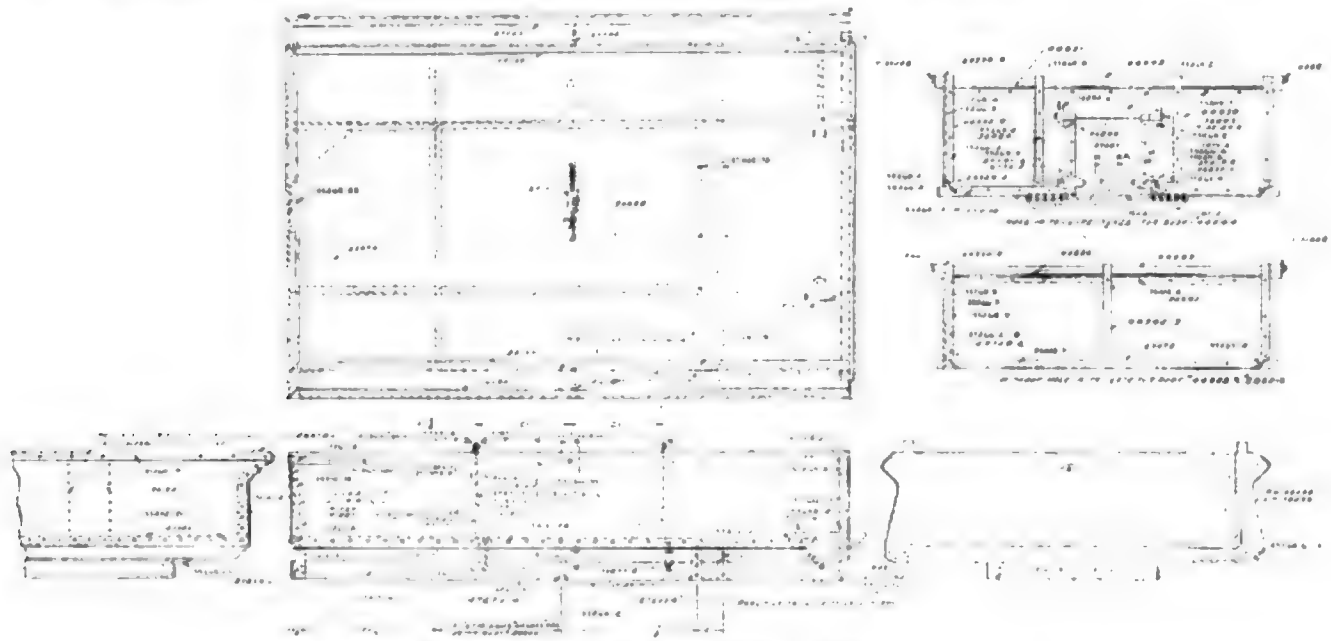


Fig. 7. Drawing illustrates the method used in detailing a standard steel dump body.

Electrics in Department Store Work

Gimbel Brothers opened their New York department store in 1910. At that time they purchased a fleet of eighty-eight electric trucks. In 1918, after eight years' use of electric transportation, they purchased eleven additional electric commercial vehicles, and in the early part of 1919 further augmented their fleet by nine additional electric trucks.

The nationally-known department store business of Gimbel Brothers has been served adequately by electric transportation for a period of approximately ten years—quite long enough for a comprehensive trial. The best proof that the electric truck has made good are the repeat orders by this concern, whose success in business is largely dependent on efficient, economic, dependable transportation.

The electric commercial vehicle is employed extensively by many of the great department stores in this country and abroad. For example, Marshall-Field & Company, Chicago, Ill., uses two hundred and sixty-four electric trucks, while Harrods, Ltd., London, England, employs seventy-two.

President Clifton, of the National Automobile Chamber of Commerce, has appointed George M. Graham (Pierce-Arrow Motor Car Company) a member of the Highways Committee, of which Roy D. Chapin is chairman.

O. E. Byron, 908 Columbia Bldg., Louisville, Ky., former manager of the Detroit Trailer Co. and later chief engineer and factory manager of the Lee Loader and Body Co., is organizing a company in Louisville to manufacture four-wheeled, semi- and pole trailers.

Watson Wagon Works has increased capital from $600,000 to $1,000,000. They have bought the Empire Axle Co. plant at Dunkirk, N. Y., the Marvin & Casler Co. plant (drill chucks) and Sherwood Bros. Mfg. Co. (wagons and sleds). The name will be changed to Watson Corporation.

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Working Draft of Funeral Car

Fitted to a 136-Inch Wheelbase Chassis

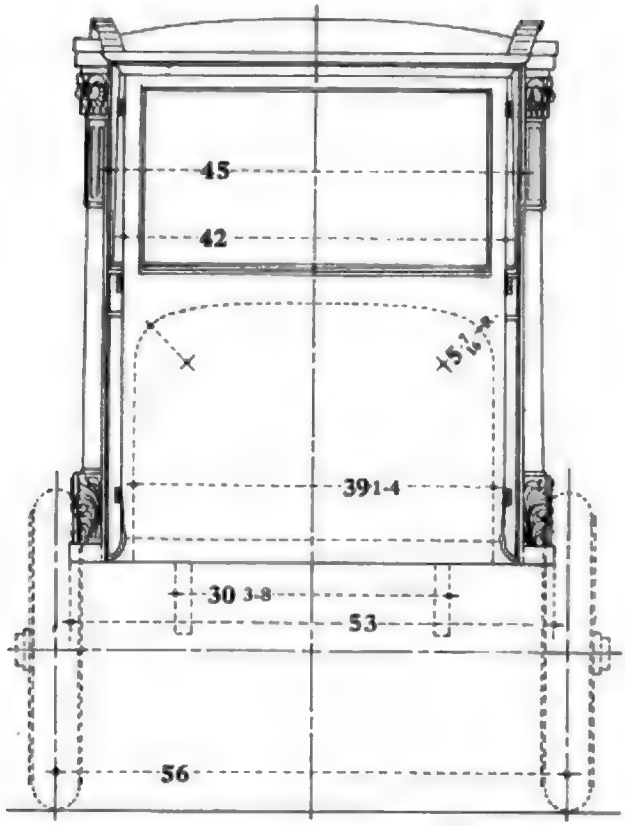
By CHARLES A. HEERGEIST

On this chassis the space from rear surface of dash to center of rear wheels is 95 inches. Deduct from this length 48 inches for length of cab and it leaves 47 inches.

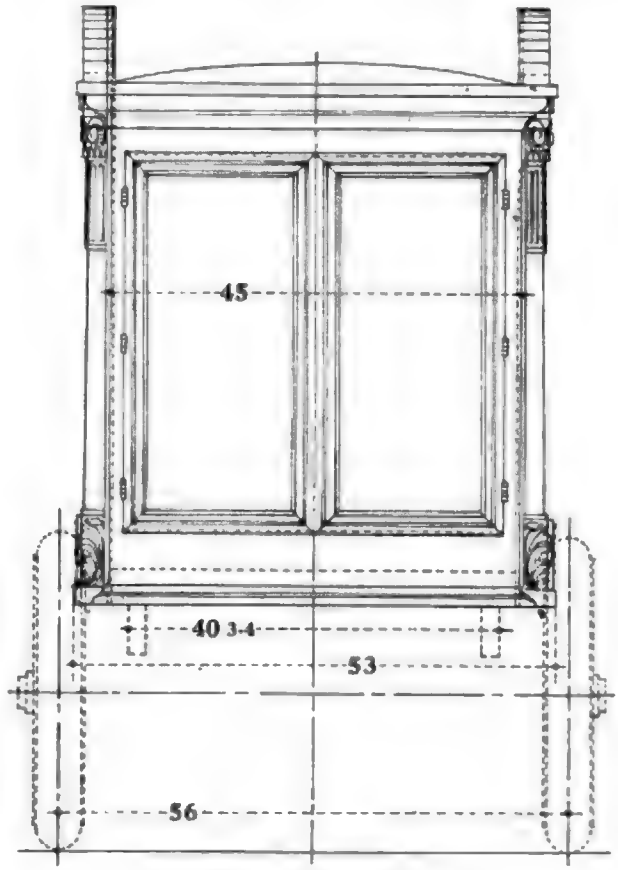
The length of a full sized funeral car from front post to rear end doors at center, without moldings, is 8 feet, including the rear curve. Thus the wheel center is between the two pillars, with the other parts equally divided. If there is a little difference, more or less curve for rear doors is given. On this working draft the amount of curve is 3 inches. Why do we prefer a 136-inch wheelbase chassis and a 95-inch space from dash to center of wheels? Because if cab is designed 48 inches long, from rear surface of dash to rear end molding of cab, the rest of the space to center of wheels is 47 inches.

We give the same amount from center of wheels to rear end of corner pillar; adding to the amount 3 inch curve will make the body 96 inches long outside, without the molding.

If the doors are 1½ inches thick, and the partition in front the same amount, the space for length inside will be 94 inches, the right length for a full size funeral car. Note the position of the rear wheels and the circular fender between the posts, touching each bottom corner, equalizing the space between the two pillars. Suppose the rear wheels are shifted forward or backward; it would cut part of either front or back pillar. If there are no pillars this would not be so apparent, but when designed with pillars the wheel should be in the center of pillars. Again we prefer this chassis for a funeral car body, because the space is only 27 inches from floor to top of frame, as the raise over the rear axle is not objectionable on a funeral car body, and the raised frame can be under the figure named above.



Front Elevation of Funeral Car Body.



Back Elevation of Funeral Car Body.

All hearses and funeral cars are built with mounts on which the casket rests; on inexpensive hearses the mounts are made from 5½ to 7 inches high, while on more pretentious funeral cars they are built up from 7 to 9 inches high, from bottom surface of sill to top of platform.

On this working draft this space is 8¼ inches, which is about the average for funeral car bodies, and is best seen on wheelbase between the pillars and above the rockers, indicated by dotted lines.

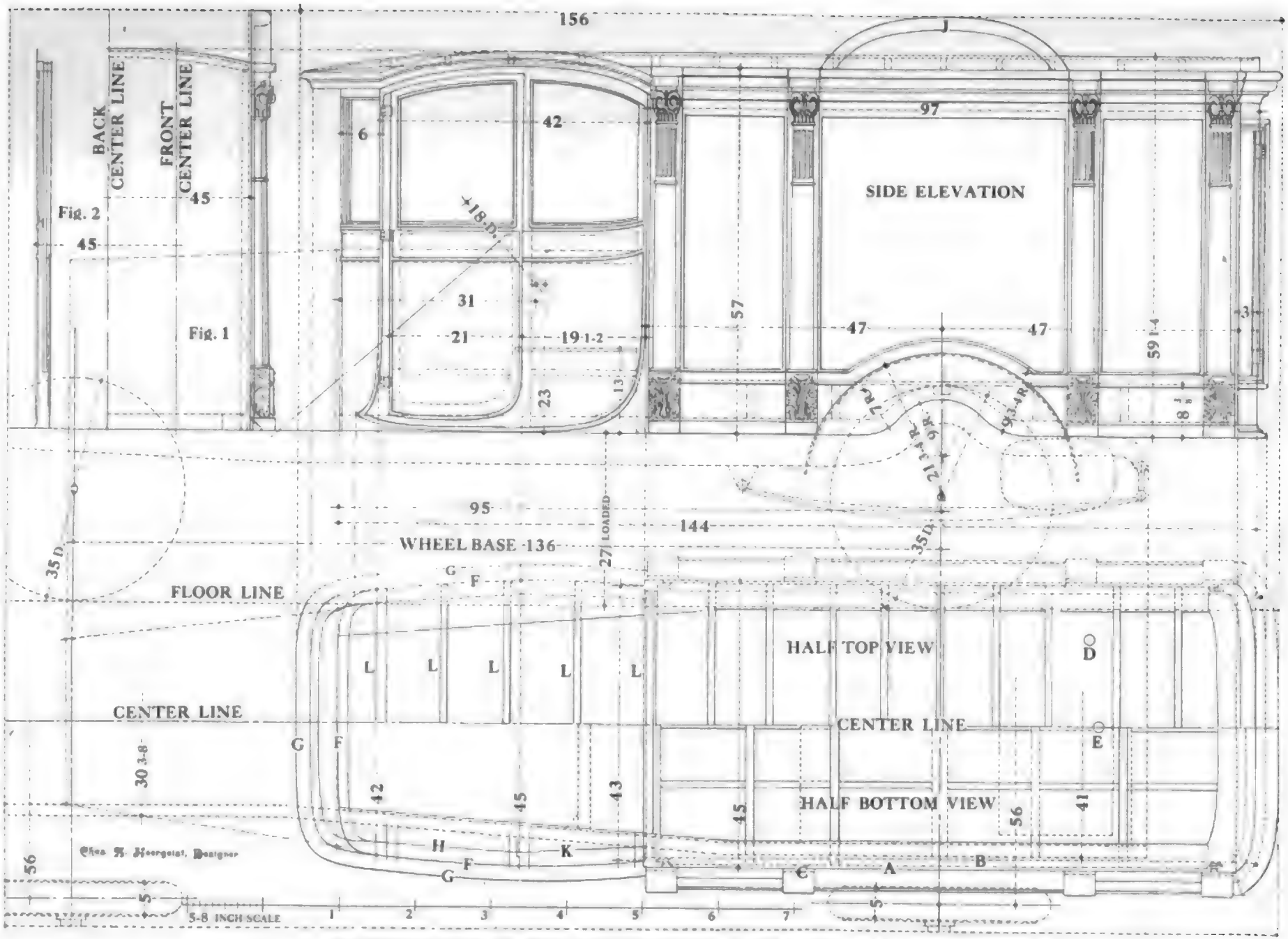
As the support of the frame is short and the length of body extends 23 inches back from center of rear wheels, rocker plates are necessary from center of wheels to rear corner, and turning around the corner on rear cross bar. The rockers are 2⅝ inches deep and 4 inches across on rear end, but toward the front they are contracted and are 7 inches across. The mount has six supports resting on the rockers and ⅞ inch boards covering the mount the entire inside length and width of the body.

Small rollers are distributed over this platform on which to slide the casket. On extreme rear end is a roller bar 24 inches long on which the casket starts to roll, till it meets the other rollers distributed over the platform. The three spaces on each side of the body are either fitted with plate glass or with curved panels, covering the entire surfaces of the three spaces each side of the body.

Years ago plate glass, in one piece, covered the entire surface, but this practice has been discontinued and carved panels substituted.

On this working draft the four pillars each side of body extend from top end of molding to base of rocker, which is best seen on back elevation; the moldings are fitted between the posts. The curve above the top cornice molding, between the two pillars, is fitted to the panels shown on A, half bottom view. This is the same ½ inch thick panel to which the plate glass or carved panels are fitted. This ½ inch thick panel is put on the top rail B, half bottom view, lengthwise, and the other ½ inch thick panel is put against it, with grain up and down. Fig. 1 shows the shape

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WORKING DRAFT OF FUNERAL CAR, FITTED TO A 136-INCH WHEELBASE CHASSIS.

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of the pillar from front or rear end, and Fig. 2 shows the cab door pillars with center line for each.

The thicknesses of the eight inside posts, four on each side, are calculated as follows: 1 inch for top rail; ½ inch for panel shown on A, half bottom view; and ¼ inch shown on C, half bottom view, outside of panel A, making the eight pillars 2¼ inches thick.

The four end pillars are 5½ inches wide and the four inside pillars are 5 inches wide, same as all the outside carved pillars. For first-class funeral car bodies, the inside surfaces are finished with built-up rosewood or mahogany, filled and varnished. These panels are ¼ inch thick and are fitted to the interior, including the top and platform, each part in one piece, without a joint. For less expensive hearses, less costly built-up or plywood is used, fitted in parts between the pillars and the joints covered with moldings.

The outside carved pillars and all the moldings and panels for rear of body are poplar. The top is covered with a moldable plywood panel.

The gasoline tank is under the body, between the side frame members. To fill the tank an opening is made in the mount as shown on D, half top view, and for examining the gas meter on E, half bottom view, a similar opening is used as on D. For a less expensive body the curve on F, side elevation, including the carving, can be dispensed with.

Number of Pieces, Sizes and Kinds of Timber for a Funeral Car Body with a Vestibule Front

Vestibule Body

Pieces No. of		Kinds of Timber	Thickness Inches	Width Inches	Length Ft. In
2	Coupé pillars	Ash	2¼		4-10
2	Standing lock pillars	"	1⅜	2¼	4-11
2	Standing rear end pillars	"	1⅜	2¼	4-10
2	Front door pillars	"	1½	2¼	4-10
2	Back door pillars	"	1½	2¼	4-10
2	Top door rails	"	1¼	1⅝	1-10
2	Fence rails	"	1¼	2	1-10
2	Molding rails	"	1¼	2	1-10
2	Bottom pieces	"	1¼		1-10
2	Side top rails, curved both sides	"			3-6
1	Curved front top rail	"	2	4¼	
1	Top curve	"	1	1⅝	4-
3	Top curves	"	1	1	4-
1	Rear end top piece	"	1½	3	3-10
2	Top moldings, curved both sides	Poplar	2⅛	2½	3-7
1	Curved front top molding	"	2⅛	2½	
1	Top panel	Plywood	¼	46	4-8
2	Door panels	Poplar or Metal	¼	23	2-10
2	Side quarter panels	"	⅛	20	2-10
1	Front metal panel	Metal			

Main Rear Funeral Car Body

2	Main sills	Ash	2¼		12-
4	Lower rails	"	1	2¼	1-6
2	Circular wheelhouse rails	"	1	2¼	3-6
	Lower top rails	"	1	2¼	7-
2	Upper top rails	"	1	5	7-
8	Inside posts	"	2¼	5	5-
8	Outside carved pillars	Poplar	3¼	5	5-
4	Lower end panels	"	⅛	9½	1-6
2	Lower center panels	"	⅛	16½	3-6
2	Upper top rail panels	"	⅛	8	1-6
1	Upper inside cross curve	"	1½	8	
2	Lower cross curves	"	1½	4	
2	Upper side cornices	"	4	5	10-9
1	Rear end curved cornice	"	4	5	
8	Short lower side moldings	"	2	2	1-6
2	Lower circular moldings	"	2	2	3-4
1	Lower rear end curved molding	"	2	2	
10	Top curves	Ash	1	1	4-10
1	Top panel	Plywood	¼	47	8-
6	Mount risers	Poplar	1⅜	5½	3-10
1	Mount platform panel	Built-up	⅜	46	8-
1	Mount platform built-up panel	"	¼	46	8-
2	Inside side panels	"	¼	46	8-
1	Inside front panel	"	¼	46	46-

Rear Doors

4	Upright pieces	Ash	1⅜	2¼	3-8
4	Horizontal curved pieces	"	1¼	2¼	
4	Upright moldings	"	2	2	3-8
4	Horizontal moldings	"	2	2	

The Cab, Called Also the Vestibule

This cab has some side curve, is rounded in front, but without turn under; Fig. 2 shows the door pillar, which is 45 inches wide on lock door joint, same width as the rear body on panel A.

The door pillar A shows the straight glass frame run, suitable for the mechanical lift, and also for the glass frame to rest on the fence rail without the lift. Curved line F, F, F, top and bottom view, represents the side curve and round front of the cab; G, G, G, the thickness of molding; H, the inside contracted top rail line; and K, the contracted inside side quarter line. L, L, L, L, L, half top view represents the top curve. This cab can be paneled with poplar panels, built-up panels, Agasote, Haskelite panels or metal sheets, any one of which are suitable for motor hearse or funeral car bodies.

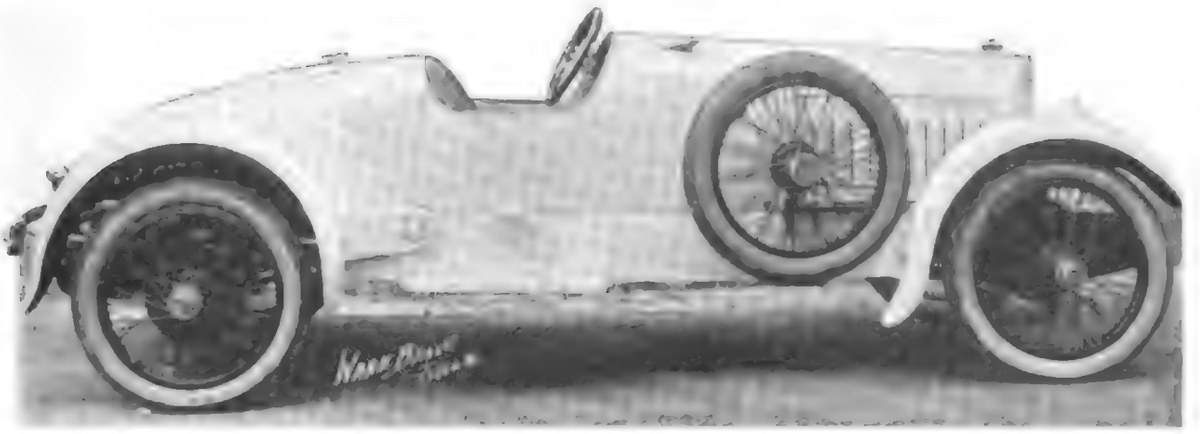
Weight Distributed by Use of Trailers

In establishing maximum gross weights of vehicles and loads, it should be borne in mind that the combination of a truck or tractor with a semi-trailer is construed to constitute a single unit, but that with such an outfit the total weight is distributed over six wheels and there is no greater concentration of load on one axle or a single wheel than when a single truck carries the load; in fact, with a given load the weight per wheel is much less. The wheelbase is also considerably extended and the weight is not concentrated on a single span of small bridges.

Weight per Inch of Tire Width

The allowable weight per inch width of tire for trailers should be greater than for self-propelled vehicles, in the opinion of trailer manufacturers, because trailer wheels are free-rolling and do not have the destructive effect of driving wheels on road surfaces. This is not only obvious but is proved by the fact that tires on trailers give two or three times the mileage of tires on the drive wheels of motor vehicles. Wear of the tire is in direct proportion to wear of the road. Therefore, if 800 pounds per inch width of tire is allowed for motor trucks, 1,000 pounds per inch can properly be allowed for trailer tires.

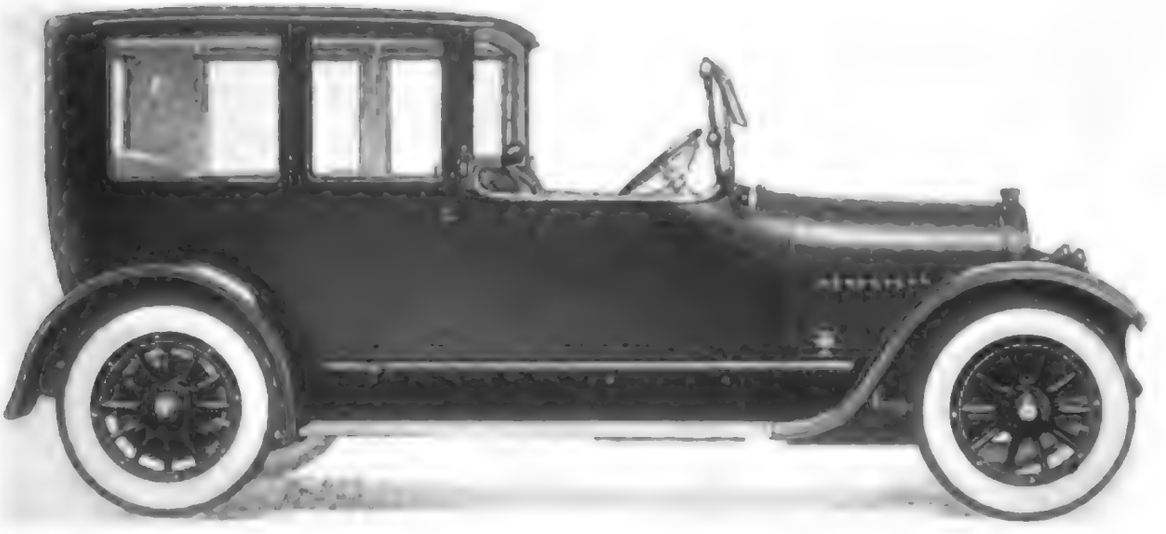
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ROADSTER BODY, BUILT BY SOWNEY BROS., PHILA., FITTED TO THE BIDDLE MOTOR CAR CO'S CHASSIS.



COUPÉ, WITH DEMOUNTABLE TOP.
Body built by Armstrong-Johnston Mfg. Co., Columbus, Ohio.



CADILLAC TOWN LIMOUSINE.
Built by The Cadillac Motor Car Co., Detroit, Mich.

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The Vehicle Monthly Course in Drafting and Construction

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Part E——Lesson 26. Obtaining Shape of Panel on High-Back Seat

(Continued from pages 33 and 34, July, 1919, of "The Vehicle Monthly.") (For description see page 35.)

Fig. 26

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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Heergeist, Technical Editor and Draftsman of "The Vehicle Monthly."

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Subjects Treated in Previous Numbers

Part E—Lesson	1	—Laying Out a Plain Board Seat	Part E—Lesson	14	—One-Piece Metal Seat Panels
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" "	3	—Framing a Round-Cornered Seat	" "	16	—Laying Out a Square Cornered Spindle Seat
" "	4	—Laying Out and Framing a Two-Passenger Seat	" "	17	—Seats with Straight and Inclined Surfaces
" "	5	—Laying Out and Framing a Twin Seat	" "	18	—Round Cornered Seat Panel with Vertical Surfaces
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" "	8	—The Laying Out of Proportional Corner Curves	" "	21	—The Creation of Bottom Curve, Length of Spindles and Position of Rails on Bottom View, by Intersections
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" "	11	—Length of Spindles on a Round Cornered Seat	" "	23	—Obtaining Lengths, Widths and Shapes of Seat Panels
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BACK NUMBERS CAN BE HAD FROM THE PUBLISHERS.

Part E——Lesson 26
Obtaining Shape of Panel on High-Back Seat

(For Working Draft see page 34.)

Explanation. Fig. 26. The high-back seat is more complicated, nevertheless the same rules are employed as explained in other lessons. As the amount of turn-under always starts from top edge of seat on rear end, the amount of turn-under on side elevation, which is lower, must be deducted from the side curve, which is shown on bottom view.

Lengthen the seat curves, top and bottom, as explained in the previous lessons. On back elevation this seat is divided into six parts each side of center line; and on side elevation into seven parts, each side of center line, on bottom view, as shown by the divisions which represent the top and bottom edge of the seat. Most of the diagram is similar to others, but we want to illustrate the converging points of back panel, the effect of curved side quarters on bottom view, and the lengthening of the divisions as is done in practice, in comparison with the method illustrated on bottom view, and other lessons.

We have shown that on all round cornered seats all the divisions on bottom view and elevations must be lengthened. For back panel the amount of lengthening is shown from bottom edge of seat F B, and top edge A D, either side of center line. Square up points E E, and C C, bottom view, to points E E C C, to seat panel when horizontal. Connect both points top and bottom, either side of center line. These two lines, E C, E C, represent the back panel when horizontal, top and bottom of seat, when not lengthened. Lengthen same as explained in Figs. 23, 24 and 25 each side of center line, as shown by points C C and E E.

Take space from point E to point F, bottom view, and put it from point E to point F, back panel, on either side of center line. Points F F represent the lowest point of seat panel on lengthened lines C E.

The converging lines of seat panel, as on base of diagram either side of center line, shown by figures, are self-explanatory.

The Lengthening of the Divisions.

We have shown in other diagrams that all lines converge and intersect with each other on back and side elevations and bottom view, so that lines A D, A D, bottom view, can be obtained by squaring across the diagram to points L L, either side of center line, and from L L and center line connecting with points from 1 to 24 either side of center line.

Note the lengthening points on all the divisions on bottom view which are all indicated by points and explained in other diagrams.

The Shop Practice of Lengthening Divisions.

The shop practice for lengthening divisions is shown on sections K and H. Section H represents the side elevation from 23-24 to C E; and section K represents the back elevation from C E to center line. Take space from point C to point E, on diagonal, bottom view, and place it from point C to point E, 24, section H. Square from point C, base of side quarter, to C, top of side quarter. Connect point C with point E, 24, representing the diagonal E D on section H.

Take space between curved lines A B, C E, on front end of seat between points 23 and 24, bottom view, and place it from point E, 24, to point 23, section H, square across from point 23, base of side elevation to point 23, top of side elevation. Connect point 23 with point E, 24. Thus all points taken from points 11-12, 13-14, 15-16, 17-18, 19-20, 21-22, bottom view, are taken and placed on top edge of side elevation, shown as 11, 13, 15, 17, 19 and 21. Square all points D, 11, 13, 15, 17, 19, 21 and 23 from top edge of side elevation into section H intersecting with all the tangent lines, producing the exact length for each division by simply following the numbers. Section K, representing the back elevation and back panel as to lengths are taken the same way. The space is so small between A C that it will be explained to better advantage on Fig. 27; but the rule is the same.

Problem. Fig. 26. Cut a block after the diagram representing the entire seat; mark all the divisions over the entire inclined surfaces; lay a paper over it, mark top and bottom edge of seat; mark all the divisions and compare with back panel on diagram.

PART E—LESSON 27 WILL APPEAR IN THE SEPTEMBER NUMBER OF "THE VEHICLE MONTHLY"

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Painting and Finishing

Bringing Up the Varnish Surface

By M. C. Hillick.

In Reply to "Constant Reader."

To understand the moods and methods of nature one must go back to the dawn of creation and walk gently down the corridor of time. In like manner, to best learn the practice of rubbing varnish one should have at least a fair understanding of some of the methods employed to develop the body of varnish necessary to afford a suitable means of surfacing it.

Success in rubbing varnish has its basis in an ample and fully rounded out body of the material. To insure this one must go back to the first coatings of material applied to the surface, for here, after all is said and done, is the very beginning of the finish of which rubbing the varnish is one of the fundamental mediums.

It is quite unnecessary to repeat the tedium of the schoolmaster in going over the facts directly connected with these first coat operations; we shall simply confine our remarks to the manner of applying the material. Through all these humble but important processes a thread of superior skill should smoothly run.

Each Coat a Law Unto Itself

Each coat should in the matter of application be a law unto itself; each should be laid on and most carefully brushed out and made as fit as expert hand work is capable of making it.

At first thought this may seem a great fuss over small feathers, but as the work proceeds and the technical formula unfolds itself, it will be found a supreme need in surface construction plans. An explanation is that the smooth and clean application of all the coats is certain to insure a minimum of surfacing labor after the varnish coats are in place. Moreover, greater durability is conferred on the finish through the cleanly and carefully applied coats of material.

Then, too, despite all manner of surfacing, the finish can never be made to have the mirror-like effects which well and skillfully applied coats of material make way for.

In view of these factors and without going deeper into the details of these preliminary processes, we shall hope that our correspondent may not, in his effort to produce a good finish, merely confine himself to the single task of rubbing the varnish to a flawless creation of finery; rather would we have him make use of all the processes leading up to the important work of surfacing the varnish in such a way and to such an extent that they shall largely confer a distinct contribution upon the rubbing work, thus making it easier, more simple and less expensive, and manifestly of a better quality.

Having reached the varnish stage of the work we may venture a word or two concerning the application of the rubbing varnish coats.

First of all, avoid brushing on these coats if you would save labor and expense in rubbing them. The varnish coats—even the varnish-color coats—should always and under all circumstances be flowed on the surface. Thus brush marks may be avoided and the biggest part of the job of rubbing eliminated.

Next in importance is to keep the surface and the freshly applied varnish clean; the less dirt and roughage you allow to lodge in the varnish during application or after, the less work you will have to do when rubbing, and the finer the finish is certain to be.

The first coat of varnish is commonly alluded to as varnish-color; usually this goes to the surface carrying about four ounces of color to a pint of varnish, which pint is the equivalent to one pound. This coat will take only a minor amount of reduction to fit it for the second coat of varnish. This coat may be glossed down with a soft, wool sponge moistened and dipped into pumice stone flour, and lightly but uniformly rubbed to the extent of deadening the lustre and breaking down any foreign matter caught into the varnish. Wash this coat, after rubbing, with the same care and diligence that one might exercise in the treatment of any of the later varnish coats. This is an unavoidable law; a breach of it enforces a penalty often bitterly unprofitable. Dust and clean for the next coat with complete attention to all details.

The second coat is to be flowed with all the varnish the surface will take care of without forming runs or sags or other impediments.

When dry use in rubbing a three-eighths or one-half inch felt pad of a size easily handled. Our choice has always been a perforated pad. Use plenty of water in the process of rubbing, and preferably, have it soft.

Use a fine grade of pumice stone flour, or pulverized pumice stone, as it is variously termed. About an F grade of fineness is suitable for automobile work, although in the hands of an inexperienced workman the FF grade would probably prove safer. Do not rub the varnish until it resists the impression of the finger nail.

Rubbing before completely dry provokes sweating out, a condition which makes a second rubbing necessary; also the soft varnish permits easy cutting through to the under coat or coats.

Here the old rule, "a stitch in time saves nine," reasserts itself to mean that by giving the varnish plenty of time to dry, even to the extent of an extra day or two, must prove a gain worth the money.

It has for a considerable number of years been the belief of the writer that the least rubbing consistent with the requirements is most desirable; that the greatest amount and depth of varnish that possibly can be left on the surface will to that degree add to the durability and appearance of the finish; it will also assist correspondingly to lessen the cost of preparing the surface for the finish.

The second coat of rubbing varnish should, as a rule, receive the most exhaustive and exacting surfacing especially upon work that is to go to the finish with three coats of rubbing, the varnish-color coat being included as one. This coat will merit a good, hard rubbing.

The Art of Rubbing Varnish

To rub varnish is a branch of work that cannot be described in phrases that may suffice to make an expert varnish rubber without any previous experience. It is rather one of those jobs which only experience can successfully teach the workman.

One of the first lessons to be learned is the importance of rubbing the varnish uniformly; that is, to the same depth over all the surface. Rub, when possible, with straight from the shoulder strokes and return; do not permit the strokes to bear with undue weight at the beginning and the end, otherwise the varnish at both these points will have been dangerously reduced, with a consequent weakness of the finish over that portion of the surface.

Aim to give your rubbing stroke an equal pressure at all stages of its journey across the surface; avoid cross rubbing at the ends of the panel.

Cut all roughage and dirt piles off cleanly; reduce any and all abnormal or foreign substances to an exact level with the surrounding surface. In a word, make the surface clean and level.

When you have reached this result, whether you have rubbed much or little—and the least is always to be preferred—the work is finished, and all additional rubbing represents an uncalled-for expense.

If this second coat is one of the three rubbing coat system, it should, as above intimated, get the real exhaustive reduction; if it is one of a four coat plan, then the hardest rubbing should be deferred until the third coat is in place and hard enough to rub right.

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The final coat of rubbing varnish, if all the factors involved have been properly taken in hand, as already suggested, will need little beside a moderate and uniform reduction of the lustre along with an elimination of whatever dust and dirt siftings may chance to have fallen upon the varnish.

If there are moldings and carvings to be taken care of, these should receive attention before rubbing the main portion of the panel; it is comparatively easy to get the plain and easily reached surface adequately rubbed, but it always requires closer attention in order to catch the outskirts. For this reason the outer edge should be first rubbed, after which take the main and plain portion.

After the regular water and pumice stone flour rubbing, a new piece of felt should be taken, and after wetting it thoroughly in clean water the surface should be given what is technically known as a water rub. This water rubbing will serve to clean up all the eroded pumice stone flour which so often tenaciously adheres to the surface and not infrequently, in the case of a varnish coat not exceedingly hard, grinds into the very texture of the varnish.

The water rub clears up all these wrong surface conditions; it, moreover, hardens the varnish and converts it into a receptive shape and into a more readily cleanable condition. In the event of leaving the surface without the water rub it becomes much more difficult to wash the surface for the next coat of varnish. In fact, if the pumice stone flour by virtue of the insufficiently dried varnish becomes ground into the surface, as it has a sure habit of doing, no amount of washing and tooling will prove equal to dislodging the pasty and adhesive material.

It is not all rubbing to rub the varnish to the smart effect most desirable; the washing of the surface prior to the application of another coat varnish is a part of the work which broadly is not of it, but technically is a vital part of it.

Hence our reader, and all readers of this department, will move rightly by giving the surface the most exacting attention in washing. This should be only completed through two helpings of water, each helping being used with a set of washing utensils specially set apart for it, and not used for any other purpose.

Soft wool sponge, a real chamois skin (perhaps cut from a Colorado sheep pelt), a clean, galvanized pail, wash brush or water tool, as you may please to call it, and plenty of clean, soft water should be included in each washing kit.

In the work use water plentifully; also the water brush. Work around the edges of the surface and under the edge of the car body with both sponge and brush; likewise about the moldings, etc. Dry off lightly with the leather, allowing evaporation to clear up the mist. All of this is a part of good rubbing.

Repainting a Black Hearse

How would you repaint a hearse that is now black, with a lot of molding and carvings on it? The paint is badly cracked. It would be a hard job to burn the paint off, so would like to know the best way to take it off without burning. I want to have the background of the carved work a dull finish after varnishing. What is the best way to do it, rub with pumice stone? About the lead coat that goes on first. What is the best way to use it? Is it a good plan to use a lot of oil to preserve the wood?

J. J. M.

REPLY.

If burning the paint off is an unavailable method then we should advise removing it with paste varnish remover, of which there are several very efficient makes to be had.

In the use of varnish remover it is always necessary to wash the surface with turpentine or alcohol, or both, or with vinegar, in order to clean off all traces of the remover. This is highly important; when it is not thoroughly performed the coats are sure to soften up, necessitating a second removal of the pigment, and beginning from the foundation again.

The best method of obtaining the required dull finish, all things considered, is to fetch the parts up in rubbing varnish, or making the last coat of varnish a hard drying body varnish, and then in due time rubbing to the preferred dull finish with water and pulverized pumice stone.

Finishing off with a little rotten stone and crude oil, or with sweet oil, will soften the dull effect and give the surface more of the dull satiny effect.

Obtaining the Dull Finish

A dull finish may, of course, be produced by means of a specially prepared paint, but this practice is not so durable nor so cleanable as the rubbed effect and it suffers by comparison with the latter in the matter of appearance.

The lead coat which goes on first after the removal of the old paint and varnish should carry, for example, one part of pure raw linseed oil to two parts of turpentine. The surface having previously been painted will not need the amount of oil in the first coat that a new, unpainted surface would. In fact it will not assimilate nor safely take care of the same proportion of oil.

It will, however, be safe practice to use the proportion of oil and turpentine above stated for the first coat; for the second coat one part of raw linseed oil and four parts of turpentine will prove a safe combination with whatever pigment may be selected.

While providing for good binding and elastic properties it is also important to know that an excessive quantity of oil is, if anything, more injurious to the finish than a deficiency. In other words, use raw linseed oil to preserve the wood and the finish, but use it carefully and never to excess.

Rubbing Roughstuff

The first essential in rubbing roughstuff is an ample supply of water right at hand; a barrel or tub makes a good contrivance for the purpose, and if possible a hose fetching running water directly into the receptacle should be provided. Next a good supply of sponges and rubbing brick will be needed. The former had best be of the soft, fleece wool sort which have an unusual water carrying capacity; the stones are a most important factor in the work. At the present time they may be procured in a size easily handled without cutting; this will be found an important saving.

Of course, to fit certain surface conformations and shapes it will be necessary to cut some of the stones, but the mere saving from the use of stone for the larger surfaces without cutting will amount to an item worth while. The natural lava or pumice stones are not much used in vehicle work today; they have so many hard atoms of earthy or mineral substances running through the lumps that it is a most difficult matter to use them without scratching and marring the surface, except at the sacrifice of time and labor in cutting the hard bits and veins out.

The artificial rubbing stones run smoother and more uniform in quality, and while such stones are found with hard streaks and some sedimental substances tracing through them, such defects are of a minor sort.

If it becomes necessary to cut the stones they should not then be used until the side or part so cut is dressed and worn down smooth and level, otherwise they may be the means of gouging or defacing the surface.

In the work of rubbing let the beginner be taught to use plenty of water under the stone so that the rubbed sediment and substance will float out and not clog the stone and serve as the means of disfiguring the work.

It is of value to bear in mind that the stone is doing its appointed work when under an even, uniform pressure it is cutting smooth with a clearly established clinging, adhesive effect. When it begins to roll and jar and work roughly it will need instant attention for at that moment it is doing damage to the surface.

In the work of rubbing, circular, whirling, zig-zag motions should be avoided. So far as may be, the straight out from the shoulder and return strokes of the stone are the approved ones.

To tell when the surface has been rubbed to a fine, level surface requires considerable practice and experience, but the act of drawing the hand at a good pressure, or the finger, across the rubbed surface at right angles to the brush strokes used in laying off the roughstuff, will help greatly to determine when a fine surface has been reached.

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Upholstery, Toppings and Mountings

The Art of Motor Car Trimming

It has been truly said that the automobile or carriage trimmer must "quilt like an upholsterer, stitch like a harness maker, and sew like a tailor." It is just as necessary that he should have good taste and a knowledge of design, proportion and color. The materials he uses are among the most costly of those employed in the factory and require great care in storage and in working, to avoid waste. So there is a great deal for the young automobile trimmer to learn before he can consider himself an expert.

Mr. Newcomb's series of articles, now running in "The Vehicle Monthly," are intended to cover the whole subject of automobile upholstering. He has taken up the art at the beginning, and as the series proceeds will impart to his readers many useful hints and helps, as valuable to most journeymen as to the average apprentice. The series will conclude with the selection of several typical cars, for which Mr. Newcomb will furnish complete trim instruction from the start to finish.

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Upholstery, Toppings, Mountings

Refinements on the Austin Car

The designers of the "Austin Twenty" have made the rear seat distant by a considerable width from the rear of the car body, and this space is used as a receptacle for the top when not in use. This provision for a top container preserves the graceful lines of the car unbroken. Nothing so mars the harmonious sweep of the body as the folded top which frequently appears as if it was something added to the body but not belonging to it.



TOP CONTAINER ON THE AUSTIN CAR.
This English device preserves the graceful lines of the body when the top is down, the top being entirely concealed from view.

The second illustration shows the Austin method of putting the spare wheel out of sight, though not out of easy reach when needed. At the rear of the body is a receptacle holding two spare wheels with their tires. The appearance of the rear of the body is thus preserved, and the wheels are safe both from injury and theft, as the compartment cannot be opened until the toolbox beneath has been unlocked.



RECEPTACLE FOR TWO SPARE WHEELS.
This receptacle holds two spare wheels with their tires. The wheel container cannot be opened until the tool box underneath has been unlocked, thus furnishing protection against theft.

Threads for Automobile Trimmers

Now is a good time to place orders for a complete line of Meyer threads and spool silks for the coming season's business. Meyer threads are furnished in any size or color wanted, for all trades where thread is used, and for both hand and machine stitching. The manufacturers also make a full and complete line of ready-wound bobbins for any style of machine. Meyer threads have stood the test for fifty years.

John C. Meyer gives the business his personal attention and his son Harold, who has lately returned from the war zone, looks after the technical end of the enterprise.

Samples of any thread required will be furnished gladly and promptly upon application to The John C. Meyer Thread Co., Lowell, Mass.

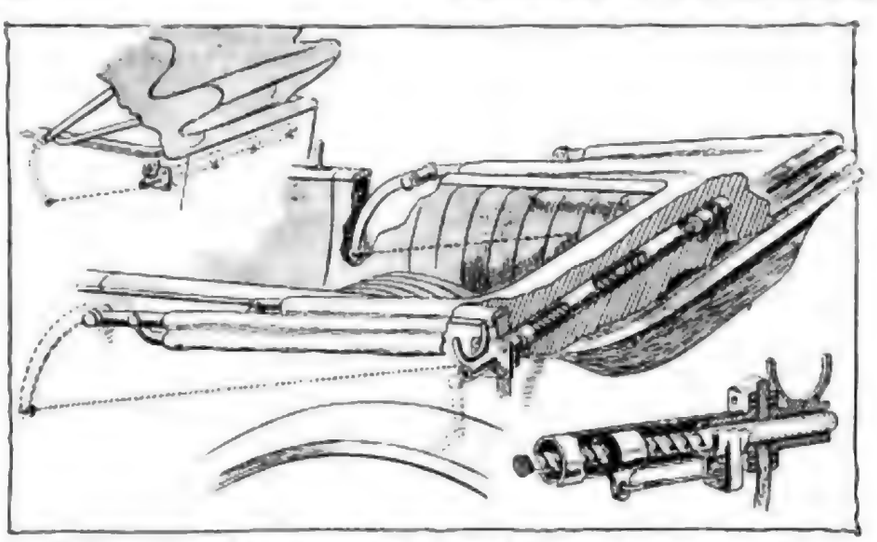
A Mechanical Top Lifter

The Blackhall Engineering Co., Ltd., an English house, has brought out a patented top operating mechanism, chiefly intended for new bodies, which is enclosed within the body paneling and hidden from view by the upholstering.

The object of the inventor has been to provide efficient and simple means to raise the top by inserting a small winch handle, and turning the same with ease. A curved arm is attached to one of the main bows or to the swivel pin carrying the bows, at each side of the body, the arms being placed inside the body under the lining, and the pin is rotatably mounted in a bearing on the outer framework carried by a bracket secured to the framework.

Each arm is connected to a block by a tensioned cable passing round suitable guide pulleys. These blocks slide and are mounted in suitable bearings on a rod, going across the back of body under the lining, which is mounted so as to rotate in side bearings.

The ends of the rod on which the blocks are mounted are formed with helical grooves —one right handed, the other left. The blocks are formed with co-operating internal helical grooves for the reception of anti-friction balls, circulating through a channel in the blocks, and a square hole is provided at each end of the rod for the winch handle. The blocks are guided and prevented from rotating by projections extending downwards, and sliding in a longitudinal slot cut in a covering tube, which encloses the threaded portions of the rod. The hood when lowered lies around the rear of body in the usual way.



The illustration shows in the center view the screw shaft running across the back of the car inside the body, also the lever extension on bows, which are controlled by the wire cable on each side. The cable and lever, also inside body, rotate the shaft by means of the detachable handle (indicated in broken lines) which has the effect of raising or lowering the top.
The top inset view shows hood partly raised; the shaft bracket is illustrated sectionally in the other view.

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The Story of an Auto Top

C. D. Abbiteau, in Du Pont Magazine

The primary processes involved in the manufacture of rubber goods are essentially the same whether the finished product is to be an auto top or a dress shield. The machinery and the principal raw products may be identical and yet a difference in the process employed or the formula used will yield a totally different product.



Spreader Room at Fairfield Rubber Plant

The methods used in the production of articles from crude rubber may at first glance appear relatively simple, yet there is perhaps no other industry where personal experience and knowledge of details count for so much. This is due to the fact that the methods of manufacture are still largely experimental, partly because the industry is still young and partly because the complex physical and chemical properties of rubber, and the secrecy which has attended its manufacture in the past have retarded really scientific and technical progress.

During recent months, however, the stimulus of forced production of new articles under war-time conditions, and the patriotic co-operation of manufacturers in exchanging ideas and methods in order to assist the government in developing and producing materials of military necessity, has opened a new era in the rubber industry, and the next decade should see the greatest progress in this field.

The oldest and one of the most useful branches of the rubber trade is the coated fabric or "proofing" industry. We are all familiar with the history of the pioneer work done by Goodyear, Mackintosh and Hancock on rubber coated fabrics. We have heard how Samuel Peal in 1791 made the first waterproof coats from cloth which had been spread with melted rubber. Later Mackintosh and Hancock found solvents which enabled them to spread the gum more easily on the fabric, and it remained for Goodyear to discover a method of curing this rubber coating by adding sulphur and heating the mixture. From this small beginning the whole industry of manufacturing raincoats, rubber coated fabrics, carriage cloth and the most recent and extensive branch, auto tops, has developed.

Let us follow the crude rubber as it comes into the factory in the form of balls or biscuits from South America, flakes, lumps and twists from Africa or corrugated sheets from the plantations of India.

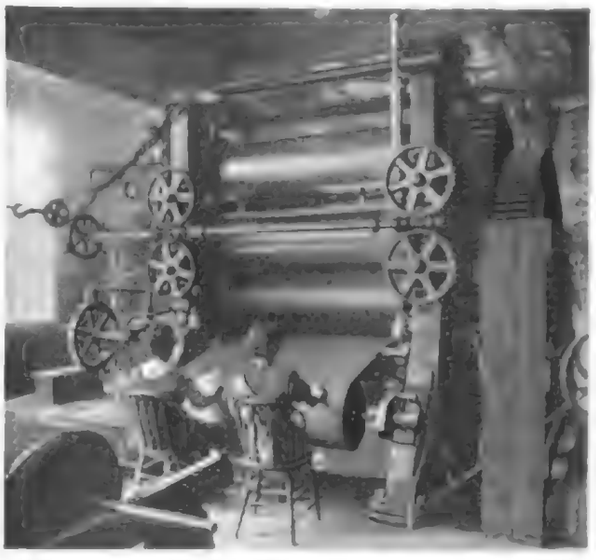
The first treatment which all rubber, except the cleanest of plantation grades, is given, is washing. The lumps or balls are first soaked in tanks of warm water to soften the gum and then cut into slices by sharp, revolving knives. These slices are put through a "cracker" or massive machine having two corrugated rolls revolving close together which shred the rubber and allow the water, which runs down over the rolls, to wash out all foreign substances such as sand and bark. During this washing process, the rubber particles are forced together, forming a rough sheet or crepe, in which form it is ready for the next process—that of drying.

The common method of drying rubber is to hang the sheets in large, ventilated rooms, which are kept at a temperature sufficiently high to dry the rubber without causing it to become tacky. Many modern factories are equipped with vacuum dryers into which the sheets of gum are placed on trays and completely dried in a few hours, whereas the older method requires at least a week.

When thoroughly dry, the rubber is taken to the compound room, where it is weighed into batches together with the proper proportions of the vulcanizing agent sulphur and such mineral ingredients and waxes as may be necessary to give the desired product. It is at this point where differences in treatment begin. The skilled compounder can take the same raw materials and by proper compounding and subsequent treatment either produce a massive truck tire capable of carrying its share of a five-ton load over thousands of miles of rough road, or a toy balloon, light and fragile as a soap bubble. It is the versatility of rubber, the never ending possibilities of its application and its unique characteristics which make its study such a fascinating subject.

After the batch has been carefully weighed, it is taken to the mixing mill, which is composed of two cylindrical rolls five or six feet long and two feet in diameter, which revolve at different speeds, giving the mass of rubber passing between them a kneading motion. These rolls are kept moderately warm and the tough, intractable sheet of rubber is milled until it becomes a soft, plastic mass which encircles the slower moving roll like the bark of a tree. The sulphur and other ingredients are worked into the rubber by the action of the other roll. When the mixture is complete, the compound, as it is now called, is ready to be given its final form before curing. If the product is to be a hot water bottle or any other molded article, the compound is rolled out into sheets, and pieces of proper size cut out and placed in steel molds which are put between steam heated plates and forced together by hydraulic pressure. Tires are built up on iron cores, using layer upon layer of rubber coated cotton duck, or rubberized cords. Strips of rubber are then added for the side wall and tread, and the complete tire wrapped with strips of fabric and cured in open steam, or else placed in steel molds and cured in a vulcanizer under hydraulic pressure.

Coated fabrics may be made by two different methods, depending upon the effect desired. Raincoats or double texture goods are made by dissolving the rubber compound in a solvent, such as naphtha, and applying it to the fabric on a spreading machine. The standard rubber spreader consists essentially of a rubber roll and a series of hot coils over which the fabric is drawn. A knife blade, resting on the fabric over the roll,



Four-Roll Calender Machine at Fairfield Rubber Plant.

(Continued on page 52)

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O'BANNON COATED FABRICS






Moleskin Quality

THE SUPERIOR LEATHER SUBSTITUTE

Gets attention of Motorists

who want upholstery that defies wear and weather, that delights the eye, that is pleasant to the touch, that is easily cleaned.

Samples will convince that Moleskin is right in weight, texture, color, etc., for the high-class touring car and roadster as well as for fine closed car work.

O'BANNON CORPORATION
200 Fifth Avenue New York

Artful applications of O'Bannon Products on next two pages






O'BANNON FABRICS

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O'BANNON COATED FABRICS

ARTFUL APPLICATIONS

A Cushion in Leather Substitute

A manufactured spring construction is used, covered with a 7, 8 or 10 ounce duck, the latter being tacked to the wood frame to which the spring is attached. Interlaced hair is cut to the size of the top of spring and placed on the duck covering. The leather substitute is sewed to a foundation of muslin, the plants are filled with cotton batts which are stretched over the superstructure and tacked underneath the wood frame, front, back and sides. The frame should be rabbited on the bottom to permit tacking flush with the bottom. The corners are plaited in and the cushion is finished.

Substitute Leather on Window Lifts

Backs of window lifts where cloth is used should be made of substitute leather. This operation is effected in the following manner: Say the lift is 2½ inches wide, cut a piece of leather substitute of the required length and 5 inches in width, which is turned to the center and cemented. The same method is used with the cloth. The two sections are then cemented together and sewed. This method finishes a smooth and durable sash lifter. Practically all carpets are bound with a leather substitute to match the color of the carpet. The O'Bannon line meets the requirements for all kinds and methods of upholstering.

* * *

O'Bannon is superior to any other leather substitute for body upholstering.

In high grade closed work it is well to pad the back of the carpet with a layer of glazed cotton wadding and line with enameled duck or drill, the object of lining being cleanliness. The O'Bannon Corporation are in a position to furnish this enameled duck or drill.

* * *

Remember all of O'Bannon products can be bought by the yard or in carload lots. Special colors and grains manufactured to meet your requirements.

Experience Teaches the "Know How"

In the manufacture of top materials it is not merely the question of selecting a properly woven cloth coating and graining it. It is a much larger and more intricate proposition, entailing considerable detail and a wide experience in the manufacture of coated fabrics. Duxrane exemplifies this statement. It is produced by The O'Bannon Corporation, an efficient and reliable manufacturing concern with unlimited capacity and an extremely wide and varied experience in the manufacture of coated fabrics.

Ask the Trimmer

A big feature of Duxrane is its working qualities. It is soft and pliable, with just the proper stretch that results in wonderfully pretty tops. Ask the progressive trimmer what that stretch means and he will tell you why he gets so much better looking tops when using Duxrane than with any other material.

O'BANNON COATED FABRICS

O'BANNON CORPORATION

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OF O'BANNON PRODUCTS

O'BANNON COATED FABRICS

"Treat It Rough"

The coating used on Duxrane is of the finest quality known and applied to the proper weight backing under the most favorable conditions and in the most efficient manner possible. That is the reason for its beauty of color and lustre. It provides real insurance against fading, cracking, sagging or peeling—common faults with other top materials.

We are so sure of it that in order to have you realize its superior value and lasting qualities we ask you to "treat it rough." Do the same with any other material and then carefully note how much better Duxrane has stood the test.

Trimming the Cowl

For cowl pads and cowl trimming, leather substitutes are equal to any other material that may be used for the purpose and due to the irregular slopes usually required it will be found extremely economical to cut from leather substitutes. Spanish leather to match the cloth in sedan or coupé bodies is best adapted for this purpose and makes the richest appearing job. In making a cowl pad, cardboard is cut to fit. Cardboard and leather substitute is cemented separately. The two are then placed together, allowing the leather substitute to form a hem, stitched by machine. Paste is never used on cardboard, since the moisture in the paste will cause the cardboard to swell and blister, while rubber cement has no effect on either cardboard or leather substitute. The pads when finished are tacked on either with gimp tacks or lining tacks.

A Classy Roof Covering

The sedan and limousine roof covering material is being used exclusively, even on the better grades of work. Its width makes it economical to cut and it stands up so much better than paint. For repair work, leaky roofs, etc., it makes a cheap and effective covering, presenting a very fine appearance with very little effort expended.

When doing a job of this kind over a laminated or patented composition roof, or in fact over any kind of a roof, it is well first to lay a covering of glazed cotton wadding and then stretch lightly and evenly the roof covering, tacking under the drip or finishing molding, letting the molding cover the tacking and raw edges. This makes a very substantial job and satisfies the most critical customer.

In top materials for touring and roadster type bodies there are not only different grains, colors and finishes, but there are several grades, so that no matter what your requirements may be they can be satisfied in the O'Bannon line. Attractively woven backing of tested strength makes this line popular with the discriminating buyer and appeals to the car owner.

When re-covering a top it is well to use one of these popular fancy backs in preference to the standard black or drab, as it adds to the appearance and makes the job individual and characteristic. Don't fail to order some of the backing separately when using these patterns, since it will save you considerable money. Use it for bow coverings, pad coverings, etc., and save the coated fabric.

200 FIFTH AVE. NEW YORK

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Top Fabrics
Duxrane, Nonleek and Standard Rubber Carriage Cloth.

3
Enameled Drills
Ducks & Fabrics
for Tire Cases, Trunk Cases, Tool Kits and other Auto Accessories

O'BANNON FABRICS

Trimming of Auto Door With Pocket

By C. G. COOK

The framework of the metal-covered doors leaves plenty of room for the pockets. I first line with bow lining the space inside of door occupied by the pockets, pasting the lining in.

I then fit double buckram to door, cutting it one-half inch smaller all around than the door, so that no heavy edges will stick out and show underneath the welt and cord. Finish around the edges, cutting out a square piece from the top as shown in Fig. 1 for the opening of the pocket. Over this buckram the material used in trimming is pasted. Cut the material used in trimming ¾ inch larger all around so it will cover the door and leave a little to trim off. Now turn the top covering back and tack the buckram to door. This can be done before the paste is dry, then as it dries the buckram will shrink up good and tight.

Next, tack the covering around the edges and trim off ¼ inch from edge. We are now ready for the flap. It can be made up on double buckram or can be made up soft on enamel duck with a layer of wadding inside of the inner row of stitching. When made up, soft-stitch a piece of ½ inch band iron in the bottom.

The flap is closed with a billet and loop as shown in Fig. 2. The billet is fastened in the center by stitching, or with button rivet. The upper end of billet is left loose so it can be pulled out of the loop and the flap raised.

The door is now ready for the finish around the edges which can be made with a round and flat welt or finished to correspond with the finish on the car. Care should be taken to set the cord around the edge back far enough so it will not cut out in opening and closing the door.



Fig. I

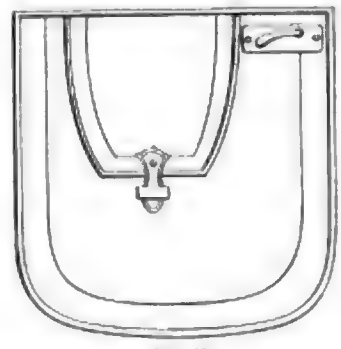


Fig. II

Diagrams Illustrating Automobile Door Trimming

Back Curtain for One-Man Top

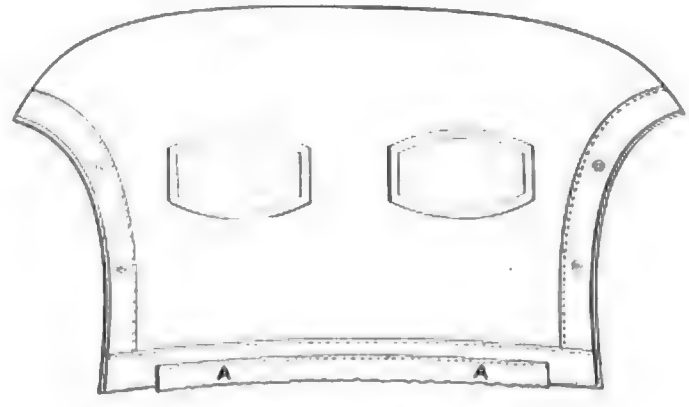
With this back curtain no back stays are made, the curtain filling the space occupied by the back stays. To save material it is best to cut a paper pattern. Let it come around on back bow to bottom of side quarter. Shape the bottom of curtain to fit the back of the body to which it is fastened.

The bottom and ends are reinforced with 3-inch strips cut to shape and of the same material as used in the curtain. The two lights are of celluloid, installed by stitching a piece of the same material on inside of curtain, forming a pocket.

Mark for the inner row of stitching ½ inch on side of the outer row. Then cut out, leaving ¾ inch to turn under so that no raw edges show on outside of curtain. The celluloid having been cut to shape, slip it in the pocket and stitch down.

Next trim out the goods forming the pocket, trimming close to stitching. For the pockets two pieces sewed together are used.

Stitch a welt across the bottom on the inside of curtain. See A A in Fig 3, 1½ inches from edge of some firm material. Tack the welt to body and trim off. The curtain coming down over the welt showing no nails. This makes a neat and durable finish. The ends are fastened with a round head screw and washer.

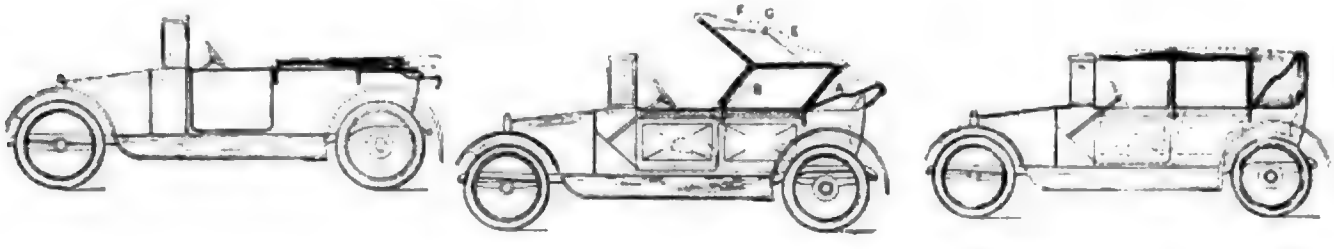


Back Curtain for a One Man Top.

A New English Top Device

The illustrations show a new patent top fitting known as the "London," and made by Lowe, Bevan & Co., Birmingham.

On reference to the illustrations, more especially to the one showing the hood being opened, it will be seen that the metal fittings carry the pillars top A and B together with the belt rail, and are at the same time continued in one unit. The fittings on the two pillars A and B are pivot jointed to the plates C and D, which are firmly fixed inside the body. These can, of course, be arranged suitable for any width of body framing at this part. At the pillar top, where the belt rails are attached, there is a light pivoted link joint E and F that at G carries the fitting when required, for an additional top bow. The striking advantage of this fitting, as well as its method of application, is that it only requires screwing on the belt rails and pillars; thus a considerable amount of time is saved through not having to "let in" in accordance with the usual practice.



A New Top Device, Made by Lowe, Bevan & Co., Birmingham, England. The operation is explained on this page.

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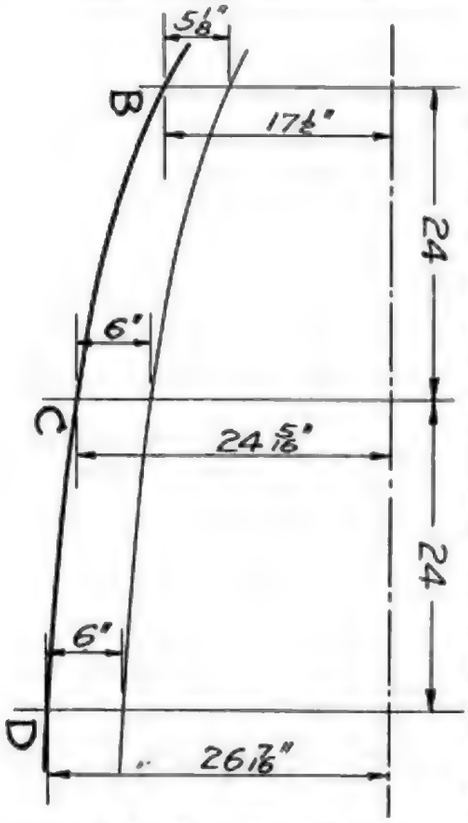
Molding a Waterproof Plywood

(Continued from page 20)

transverse tension exerted between the die and the side plates, and arising from the pulling of the panel between the plates.

The male dies were made of cast iron in several sections and each section was provided with steam coils to furnish heat for drying. In some of the molding numerous jets of live steam were sprayed upon the upper face of the panel as the press was closing, and this seemed to be beneficial. After the press had closed, this steam was turned off and air was circulated over the panel to remove the moisture rapidly. The shell was commonly left in the press from 30 minutes to one hour; in the second half-hour the male die was generally slightly lowered, freeing it from contact with the shell, to give more uniform heating and to provide some circulation below the shell.

In molding Haskelite tensile strains seem



Method of Estimating the "Upset" in Molding Haskelite.

to be absent, since the tensile strength in the soft condition, after boiling, is so much greater than the compressive strength. Another reason for their absence lies in the form of the section of the die used.

That there is a large compressive upset one can readily detect without any calculation. The panel at first lies between the side plates mentioned above, with a few inches projecting beyond the front ends of the plates. As the molding proceeds this projection becomes less and less, showing that the portion of the panel that lies between the plates is getting shorter by several inches. It is easy to see that the fibres of transverse grain may be crowded closer together, or the hollow cylindrical cells somewhat deformed so that they are no longer true cylinders. But the longitudinal fibres are also upset, shortened, and perhaps bent and distorted over short lengths, but not broken in two, since the strength is not decreased by the molding process.

But these compressive strains, or upsets, are not the only strains by which molding takes place. Any one knows that he can stretch his handkerchief smoothly over a considerable portion of his knee, and in taking this (molded) form, the threads of the handkerchief do not become appreciably longer or shorter; the threads of warp and woof are, however, no longer at right angles to one another; between adjacent parallel threads there has been a slight slipping movement just as there is between the leaves of a book when the back of the book is twisted or rotated. The threads of the handkerchief have become sheared in fitting it to the knee, and a similar action takes place in molding Haskelite, particularly near the end of panels.

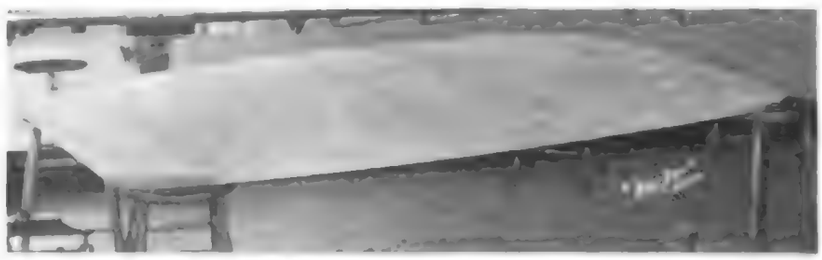
While shearing strains constitute an important part of molding Haskelite, it has been customary to estimate the upset as if it were the only kind of strain involved. A method for estimating the upset in molding may be explained by reference to the adjacent figure. The curved line B-C-D represents a portion of the outline of a fuselage seen in side view. The ordinates of points, B, C, and D are given with respect to some straight line such as the propeller axis, shown as the dot and dash line in the figure. The intermediate curved line represents the edge of the molded shell, seen in side view. The depth of the shell is given at each station.

The mean of the ordinates at B and D is 21.97". If this is subtracted from ordinate at C, the difference is 2.34". Half the product of the two spacings between stations is 288 sq. in. The radius of curvature is 288/2.34 = 123". The upset is the depth of the shell divided by the radius of curvature. 6"/123" = 0.0487 or 4.87 per cent. at station C. The calculation is a little more complicated when the station spacings are unlike. The value 2.34" is the distance from C to a point which is on the vertical through C and on a straight line from B to D, and this definition does not change if the spacings are unequal.

The above illustration is from the actual design dimensions for one of these fuselages at a difficult section. This upset was probably exceeded in the dies since they were generally so made as to over-run the actual requirements so that there should be no difficulty in cutting a molded shell to a large enough size to make proper joints.

In fuselage molding it seems desirable to have a rather blunt nose which requires a rather high upset. On these fuselages the nose designs call for the following upsets: 2.4%, 3.0%, 7.0% and 8.0%. The first two appeared to give no trouble while the last two were probably not reached, although the dies were designed to produce them.

It was noted above that shearing strains take place in molding if given a chance to develop, and that in general they are to be expected near the ends of the panels. It may



Haskelite Molded Roof for an Automobile Body.

be noted now that the process of molding as incompletely described above is not well adapted to the production either of much upset or of much shearing strain at the end of a panel. The process as described served admirably for the canoe in which the main upset is probably along the middle, but without modification it did not work well at the nose of a fuselage. The modification adopted was the employment of a cap to fit the nose of the male die, and this cap was brought down on the upper face of the panel rather early in the molding process, so that the shell would be certain to fit the die at this section.

Molded fuselages have shown substantially all the advantages that were expected of them. In their design it seems desirable that the distribution of upset should be carefully taken into consideration and it seems not at all improbable that satisfactory forms can be designed which will require but two panels with joints at the top and at the bottom, instead of four panels with four joints.

Since the armistice was signed molding has found its principal use in adopting flat Haskelite panels to the curvature required for fixed roofs of automobile bodies. Preparation for the extension of molding to other parts of automobile bodies are under way and one complete molded body has been made.

Readers of the article by Mr. Lawrence Ottinger in the July, 1919, issue of THE VEHICLE MONTHLY, will recall his statement that "There are complete engineering tables on the strength of various constructions of all the commercial veneers, their weight, the effect of vibration, their action under every imaginable stress and strain." Those readers may be interested to know that these tables were largely prepared by the Haskelite organization on the sound belief that Haskelite could not enjoy the whole confidence even of its own sponsors until it had been admitted, under the severest possible tests, to the company of its dearest competitors.

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News in the Trade

What Truck Makers Say of Trailers

American motor truck manufacturers have kept a watchful eye on the development and use of trailers and many of them have decided that the trailer and semi-trailer are the most important development in highway transportation next to the motor truck itself. This decision has been reached after careful observation of the results obtained with trailers by users of their respective makes of trucks.

Five or six years ago some of the leading makers were opposed to the use of trailers with their trucks, but today their attitude is quite different. Writing to a large trailer manufacturing company, the district manager of one light truck company says:

"I am frequently called upon to furnish information concerning the adaptability and profitable employment of trailers to meet various conditions of truck transportation. My work is first and last that of placing our own trucks in service, yet I realize that the trailer proposition is so closely related to truck transportation that in making a true delivery analysis, to ignore the trailer is to work an injustice to efficiency and economy. The trailer has received scant consideration by dealers as against its importance. When I can conscientiously recommend their use, I shall be very glad to do so, in the interest of all concerned."

Trailers Double Truck Earnings

A number of truck companies have expressed their attitude toward and confidence in trailer transportation in letters addressed to the Trailer Manufacturers' Association of America, 110 West 40th Street, New York.

"A very large number of GMC trucks are now hauling trailers successfully," says the General Motor Truck Co. "In fact, the last year has seemingly been a period in which the transportation people of the Nation have, with almost one accord, come to realize the fact that through the use of suitable trailers the earnings of the motor truck are doubled, and in some cases more than doubled. Through tendency on the part of the buying public, coupled with our own belief that by the use of the trailer still greater economies are possible, our Model 41-T GMC tractor was designed and is now in regular production, being of six-ton capacity and used in connection with the semi-type trailer as well as four-wheeled trailers."

Equipment Includes Trailer Draw-Bar

"This company is the only manufacturer of motor trucks, so far as we know, that adds a spring trailer draw-bar as regular equipment on all worm-drive models," writes the Gramm-Bernstein Motor Truck Co. "This would indicate our position on the trailer question and, in fact, we are very strongly in favor of such devices in a good many cases to increase the efficiency of our truck. We manufacture tractor trucks in four, five, seven and ten-ton capacities for use with semi-trailers."

Dealers Recommend Use of Trailers

The Service Motor Truck Co. manufactures special tractors for use with semi-trailer and rocking fifth wheel, and its dealers recommend the use of trailers with its regular models when they are sure the interest of the owner will be sufficiently advanced thereby. The company has made a thorough investigation of the practicability of trailer use and has, theoretically, established the true relation of trailers to its trucks. At the present time it is preparing this data in the form of a loose-leaf folder which will soon be in the hands of all of its dealers and salesmen. A department for the soluton of transportation problems is maintained and is prepared to recommend advantageous methods of hauling to prospective customers and lend assistance to salesmen in the field as required.

Use of Trailers Should Be Encouraged

The transportation engineering department of the J. C. Wilson Co. has been carrying on a most exhaustive investigation which proves that the use of trailers or semi-trailers should be encouraged under proper advisement of its engineers.

"We strongly recommend the use of trailers and semi-trailers and have done so for the past three years," says C. E. Stone, the company's engineer. "We manufacture special tractor trucks for use with semi-trailer bodies in 3 to 5, 5 to 7, and 7 to 12 tons capacity. There are also a great many instances where we have recommended and sold our standard trucks in connection with trailer requirements and have our standard trailer connection for attachment which is fitted with springs to take the pull and thrust of the trailer. When this is fitted to our chassis, the rear cross member of the frame is fitted with special braces."

Dump Trucks Have Trailer Attachments

The Sterling Motor Truck Co. manufactured a tractor truck model of either 110 or 130-inch wheelbase on its 2½-ton truck only, but is contemplating the manufacture of a similar tractor on its other models.

"All of our dump trucks are equipped with trailer attachments, and all other standard commercial trucks are so equipped when specified," writes the assistant general manager. "We do not especially recommend the use of trailers except when operated in connection with a fifth wheel, and then because of the extreme practicability in the lumber business."

Lists Tractor With Standard Models

A special straight-line-drive tractor from 2 to 7 tons capacity is listed with its other standard truck models by the Winther Motor Truck Co., whose dealers are instructed, however, to recommend the use of trailers and semi-trailers with its regular models if unable to interest customers in the special tractor. A government pintel hook is attached to the back of the frame, properly reinforced, at the request of customers. "After road conditions are taken into consideration—as they always are—no changes are necessary in our standard construction," says the company.

Statements of similar general character by numerous other truck companies show that they anticipate an important growth in trailer transportation and are satisfied that the use of trailers with their trucks and tractors is advantageous and economical to their customers under favorable conditions of road and service. Many of them are manufacturing special short-wheelbase tractors especially for drawing trailers and semi-trailers, and others are preparing to bring out such models.

Government to Make Good Roads Exhibits at 57 Fairs

Complete exhibits designed to show the various types of highway construction now in use in the United States, together with beautiful photographs illustrating the effect of roadside treatment and scenes of striking interest to be found along the highways of the United States, will be shown this year at fifty-seven fairs, under the supervision of government authorities.

These collections will form part of a series of government offerings which will be open to visitors to fairs all over the United States. The series depicting roadside treatment is expected to prove of especial interest as this subject is one which is only just coming home to American road builders.

The photographs indicate forcibly the great beauty which may be added to highways through a little attention to shrubbery, trees and vegetation generally along the road.

Someone is saving what you spend foolishly. Who is depositing your dollars? Invest them in War Savings Stamps and save them yourself.

Where do you live? The best place is Easy Street. You get there through Safety Lane. Take the War Savings Stamps Road.

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Automobile Makers to Unite for Foreign Trade

By Alfred Reeves, in "The Automotive Exporter."

Having provided about every fifth family in the United States with an automobile, the motor car manufacturers are planning an intensive export campaign to motorize the rest of the world.

They are not wanting in confidence that an article which had been found so useful to Americans that they are today using 6,000,000 and still demand more than the manufacturers are able to supply, will make an equally strong appeal to residents of other countries.

Up to date the insatiable home demand has been so hard to satisfy that the manufacturers have exported less than 5 per cent. of their output, but even so the export trade amounted to more than $90,000,000 in the fiscal year ended June 30, 1916, and $90,000,000 in 1917, for automobiles and trucks alone.

During the last six fiscal years (1913 to 1918 inclusive) the United States exported 249,832 passenger automobiles valued at $205,386,980, and 65,218 motor trucks worth $173,082,943, wholesale, not including shipments to the American expeditionary force.

Accessories Export

In addition to the exports of complete cars and chassis, the manufacturers of engines, tires and other parts and accessories exported these articles to a total value of $173,234,593 during the same six year period. Thus the grand total of foreign sales in the last six years was more than $550,000,000. And very nearly 70 per cent. of this volume of sales was made in 1916, 1917 and 1918.

War conditions, of course, were largely responsible for this sudden growth of exports. The Allied governments made large purchases of automotive products in this country, particularly of motor trucks.

Later, however, exports were virtually shut off, as importation was prohibited by England, British India, the Straits Settlements, Federated Malay States, France and Tunis; Ceylon imposed 100 per cent. import duty, Canada prohibited importation of passenger automobiles costing more than $1,200 f. o. b. factory, and shipments to Russia, the Scandinavian countries and others bordering on the countries with which the allies and the United States were at war became almost impossible.

At the same time available shipping space to other parts of the world was scarce and difficult to obtain and ocean freight rates were several hundred per cent. above normal.

It is especially noteworthy that under all these handicaps the exports in 1917 and 1918 should have been several times larger than in any pre-war year.



TOURING BODY ON STEARNS-KNIGHT CHASSIS.
This car, of which another view appears on this page, is shown with the one-man top raised. Top has removable plate glass windows in rear curtain. The top folds down into the body of the car. Body built by The A. H. Gabel Co., Rochester, N. Y.

Export of Trucks

Largest increases in exports of passenger automobiles during the war period were to Japan, China, Philippine Islands, South American countries, Mexico, Cuba, Spain and Canada. There were tremendous increases in truck exports to England, France and Russia, but these were mostly on government orders for war purposes.

It is more important to consider the growth of truck exports to countries in the western hemisphere and to Norway, Japan, Philippine Islands and the Dutch East Indies. These countries virtually knew nothing about American motor trucks before the war—or any other motor trucks.

Five years ago motor trucks could not be dignified as an article of world commerce. The war advertised them to every country on the globe.

At a recent convention of export managers of the leading automobile and motor truck companies that are members of the National Automobile Chamber of Commerce it was determined to promote its foreign trade on broad American business lines and to insure that customers abroad get full value for their money, satisfactory shipments and the best possible service on American cars in their home countries.

These companies that are not as yet in position to maintain individual sales and service organizations in all the foreign markets may combine with other similarly situated car manufacturers and perhaps with tire and accessory makers under the provisions of the Webb-Pomerene act.

It is recognized that one important development precedent to motorizing many countries is the improvement of the highways. There is in contemplation the preparation of road improvement literature in English and Spanish and its distribution abroad.



TOURING BODY ON STEARNS-KNIGHT CHASSIS.
Painted drab green, dull finish, with leather to match. Has brass lamps, wind-shield fixtures and brass mountings throughout. Top is folded down into the body. Another view of this car is shown on this page. Body built by The A. H. Gabel Co., Rochester, N. Y.

Acme Truck in Scandinavia and Mexico

The Acme Motor Truck Company, Cadillac, Mich., announces the appointment of the Aktieselkabet Autocar Co., of Copenhagen, Denmark, distributors for Acme trucks in Denmark, Norway, Sweden and Finland. Mr. Frantz Nehammer is president of the new company. The Acme is now represented in Mexico by Gmo. Verduzco & Co., Avenida Juarez. Conditions in Mexico are not "exactly normal" just now, but in spite of that fact, business is opening up in good shape. Connections previously formed in Holland and several other countries all report satisfactory progress, and the future export business of this company looks very promising indeed.

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A Page From Cincinnati

The C. B. N. A. Convention

Already the boom for a large attendance from Cincinnati at the Carriage Builders' National Association convention in Chicago, during the week of September 22nd is inaugurated. A special train for the occasion will be chartered. Full details will be published in these columns in our next issue.

Cincinnati is always well represented at the conventions of the C. B. N. A. Theodore Luth, of the Executive Committee, is working diligently with this end in view, and assures those who avail themselves of the opportunity to visit Chicago during convention week, a very pleasant and profitable time.

Carriage Business Good

The carriage factories in Cincinnati are more than busy and all are filled up with work. There is every indication that carriages and buggies are used in certain sections where the auto is not practical. Particularly is this true in a large portion of the South, and it is not surprising that the horse-drawn vehicle trade is holding up so well.

In not a few instances, orders for immediate deliveries are refused on account of the inability of the manufacturers to ship promptly.

Early in the year there seemed to be somewhat of a decline in the prices of various material, but this situation failed to continue for any length of time. It is now a known fact that prices have since advanced and will continue to advance, and those dealers who had the foresight to place their orders for carriages for later deliveries are the fortunate ones.

The Vacation Season

The Cincinnati Carriage Makers' Club is on its usual summer vacation. The first meeting of the fall season will be held probably on the second Monday in September. Further details will be published in THE VEHICLE MONTHLY.

Motor Truck Parade

On June 23rd Cincinnatians witnessed one of the most stupendous motor truck parades ever given there. More than three hundred and fifty models were in line. The parade is part of a plan to encourage the "ship by truck" movement that is in vogue throughout the country. Banners bearing "Ship By Truck" and "We Want Better Roads" were lavishly displayed. Mayor Galvin of Cincinnati and other city officials took a prominent part in the demonstration.

The "Sayers Six."

The Sayers & Scovill Co., who manufacture the popular "Sayers Six", are having an unprecedented demand for this beautiful car. Emil E. Hess, general manager of this concern is authority for the statement that their output is sold up as far as January 1, 1920. Milton E. Bernhard, general manager of The Motor Sales Co., of Baltimore, distributors of the "Sayers Six" in that vicinity, was in Cincinnati during the week and left with a number of the cars. He drives them to Baltimore and in that way is assured that he gives his customers cars that are thoroughly tested.

Another distributor for the "Sayers Six" who was in Cincinnati during the week and left with several cars, was D. D. Knight, of Greenwood, S. C., distributor for the "Sayers Six" in the South.

It is gratifying to Cincinnatians to know that they have a live wire company here making passenger cars.

Cincinnati News Notes

C. F. Carpenter, of D. L. Carpenter & Co., is out of Cincinnati looking after trade.

* * *

J. P. Arnoldi, of The Royal Varnish Co., Toledo, Ohio, called on his Cincinnati customers during the month.

* * *

A. H. Ahlbrand, Seymour, Ind., president of the C. B. N. A., called on his Cincinnati friends during last month.

* * *

A. G. Thies, of The Edward F. Alf Co., is traveling for his company and from all reports he is having a decidedly good trade.

* * *

The United States Electrical Tool Co. has enough business booked to last several months, but is taking care of all orders.

* * *

The G. A. Schacht Motor Truck Co. is another progressive concern that has enlarged its capacity to take care of increasing business.

* * *

L. A. Geserich, of The Cotex Company Newark, N. J., manufacturers of artificial leather, was in Cincinnati for several days visiting his trade.

* * *

Clen Perrine, manager of the Brown Carriage Co., was out of the city during the month and reports trade as being very brisk with his concern.

* * *

Henry Voss, manager of the Monarch Carriage Goods Co., is having a very good trade for his firm's popular line of auto and carriage accessories.

* * *

The Cincinnati Electrical Tool Co. is as usual very busy and working full-shift. This company's portable electrical drills and reamers are in big demand.

* * *

The Edward F. Alf Co. is having a very satisfactory trade and is rushed with orders. A. Gruber, the Cincinnati manager, is very much gratified with conditions.

* * *

The Auto Vehicle Parts Co. is very much pleased with business. Clarence Rennekamp, manager of this enterprising concern, is very optimistic regarding the future.

John A. Creighton, of the Truscon Laboratories, Detroit, is on the road for his concern. Mr. Creighton enjoys a very nice trade and has many friends in Cincinnati.

* * *

Stewart Kelly, representing the Du Pont Fabrikoid Co., Wilmington, Del., was in Cincinnati during the month, and advices that business with his concern is booming.

* * *

T. J. McNamara and John Oppliger, of the Phoenix Carriage Co., have been on the road in the interests of their concern and state that the carriage business is better than ever.

* * *

Theodore Luth, of Luth Carriage Co., has just returned from the East. He was visiting his trade and at the same time took in a little pleasure. Mr. Luth's factory is deluged with business.

* * *

E. V. Overman, general manager of the Standard Parts Co., is now very conveniently situated in the Union Central Building, Fourth and Vine Streets, Cincinnati, where he will be pleased to greet his many friends.

* * *

The Trailmobile Co. manufactures a high grade trailer. This concern is very busy indeed and has thousands of its trailers in use. This company supplied the Government, and during the war was 100 per cent. on Government work.

* * *

Haberer & Co., manufacturers of commercial bodies, have leased the old building of the Hickory Carriage Co. in addition to their present buildings. This concern is enjoying a very good business and is ever on the alert to increase its capacity to take care of its many new customers.

* * *

The United States Motor Truck Co. is very busy and is working very hard to supply the demand for its popular trucks. This concern furnished trucks to the United States Government during the war, which is evidence that its product is well worth investigating by those who are in need of a first class truck.

* * *

W. F. O'Brien, a member of the board of governors of the Cincinnati Carriage Makers' Club, and representative of The Ault & Wiborg Company, varnish and paint manufacturers, of Cincinnati, was married on the morning of June 18th to Miss Lida M. Dewey, of Walnut Hills. The ceremony took place at St. Francis de Sales church at 8.30, after which the immediate relatives motored to the Hotel Gibson, where an elaborate wedding breakfast awaited them. At noon Mr. and Mrs. O'Brien departed for a trip East. Atlantic City, New York, Philadelphia were on their itinerary. The happy couple will remain away for three weeks. They have the heartiest congratulations of their numerous friends.

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The Story of an Auto Top

(Continued from page 42)

holds back a bank of rubber cement and distributes a thin film on the surface of the fabric, the hot coils evaporating the solvent and leaving a layer of rubber. After coating, the fabric is doubled by placing the two cemented faces together and running the combined goods between rollers under pressure. This process is especially useful in preparing double texture auto top material, as two layers of fabric of different weaves give much greater strength and resistance to tear than a single fabric, while the layer of rubber between the plies enables the material to resist penetration by water even under heavy pressure.

This possibility of making rubber so highly impermeable together with its natural flexibility and wear-resisting qualities makes it peculiarly fitted to stand the rough usage and exposure to which an auto top is subjected. It is because rubber alone possesses these qualities that it is used in covering the great dirigible balloons, and in making the face pieces of the gas masks which so effectively protected our soldiers from the poisonous gases of the Hun.

While nearly every motorist is acquainted in a general way with the structure and quality of the tires with which his car is equipped, it is safe to say that few trouble to inquire into the relative merits of different top materials or the companies which manufacture them. Yet the top contributes as much as any single item to the appearance and life of the machine. No car looks well if the top is shabby, while, if leaks develop, the interior finish and upholstering as well as the passengers, will suffer grievously.



An Embossing Calender at Fairfield Rubber Plant.

The other method of applying rubber to fabric is called calendering. During this process the rubber compound, which has been worked into a plastic dough on the mixing mills, is fed into a machine which consists of three and sometimes four immense rolls set one above the other in an adjustable frame. By means of screws the rolls are set close together allowing only a thin layer of rubber to pass between. This film encircles the middle roll and is pressed upon the surface of the fabric which is drawn through between the two lower rolls. After the material has been coated it is run through an embossing calender which imprints the desired grain in the coating. The rubber is given a thin coat of varnish and then vulcanized by hanging the material in large ovens capable of holding a thousand yards of fabric. These ovens are heated by steam coils to a sufficient temperature to cause the chemical union of the sulphur and rubber. This process changes the nature of the rubber so that it is no longer softened by heat or stiffened by cold. If it has been properly compounded it will contain pigments which will prevent the penetration of the sun's rays, and waxes which close even the minute pores of the rubber, making it air, as well as water tight.

For this reason, and because all top materials look much alike when new, the person buying a new car or having one retopped should insist on a top material made by people whose products and promises he can depend on. With reasonable care a good top should last for several seasons.

The Fairfield rubber factory, even before it became part of the Du Pont Fabrikoid Company, had long enjoyed the enviable reputation of turning out the highest quality auto top material and coated fabrics. Since its purchase by the Du Pont Company in 1916, the quality of the product has been greatly improved, and the capacity of the plant increased by the installation of modern equipment and the employment of scientific methods.

If you can't save the first dollar, you can't save the last. Invest every pay day in War Savings Stamps.

Training, a Great Industrial Need

It has been established beyond question, says a bulletin just issued by the U. S. Training Service of the Department of Labor, Washington, that training in the industries for the industries is one of the big practical steps toward removing social unrest that is born of or aggravated by incompetence and meager wages. The publication bears the title "Industrial Training in Representative Industries" and gives a detailed account of how training departments are conducted in various plants and what results have been achieved by them. The pamphlet is for free distribution.

One of the concerns cited, which gives training, makes cylindrical and surface grinders. The enrollment in its training department has ranged from 40 to 60, five to eight graduating weekly into the shops. Training is given in light assembling, the operation of various drilling and milling machines and lathes, tool and cutter grinding machines, shaping machines, etc. This company lists the benefits of training as follows: "It stabilizes labor turnover, reduces accidents, and provides the greatest opportunity not only for teaching principles but for putting American citizenship into practice."

A concern making loom machinery and sewing machines, according to the bulletin, has required practically every applicant to take training. The management strongly endorses the work.

"The outstanding fact is that a majority of workers in industry today are seriously handicapped for lack of proper training in their respective tasks," say the bulletin. "Haphazard instruction or no instruction at all has marked their introduction to their work." The work of the Training Service has been to aid interested concerns in establishing training courses which will remedy this present wasteful condition.

Spring-Making Machinery Wanted

J. A. Pugsley & Co., St. John, New Brunswick, Canada, are about to commence the manufacture of standard automobile springs for replacement and also for factory equipment. They will enter the business in a modest way at first, but feel that before long a considerable business will be built up. This firm would like to hear from manufacturers of spring-making machinery, as they are in the market to purchase a small but complete unit of machines.

J. A. Pugsley & Co. are located in the plant formerly occupied by The Ford Motor Co. of Canada, Ltd.

Death of A. E. Skadden

The death is announced of A. E. Skadden, general manager of the Norwalk Motor Car Co., Martinsburg, W. Va., on Sunday, June 22. The late Mr. Skadden was responsible for much of the success with which this company has been favored and his passing will be deeply felt by his business associates as well as by many others with whom he had formed lasting friendships.

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If it "*looks*" like leather
If it "*feels*" like leather
If it "*wears*" like leather

It is COTEX

The Dependable

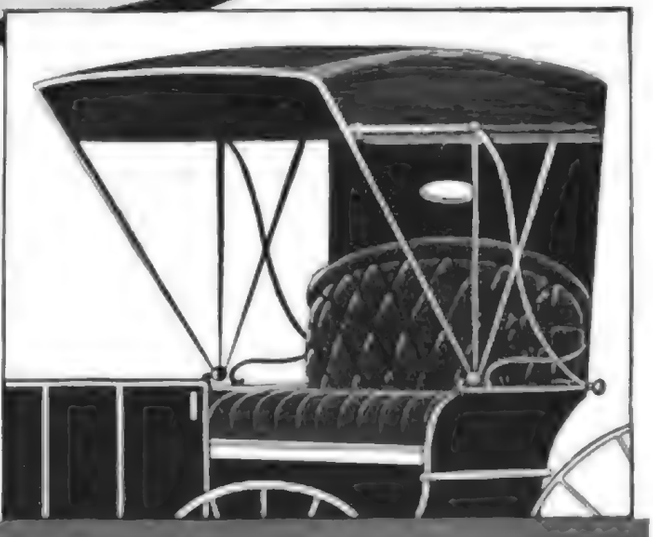
LEATHER CLOTH

Made in a variety of

Weights
Colors
Grains

Write for Samples





The COTEX Company
Sales Office
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Factory
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Using Haskelite means backing Haskelite



A page from the Franklin Automobile Co's

DEALERS' BULLETIN SUPPLEMENT 7.3.19 issue

STYLE PLUS COMFORT IN THE FRANKLIN

THINK OF SEVEN MEN STANDING ON YOUR SEDAN ROOF

A TIP

LET THE COURT DECIDE

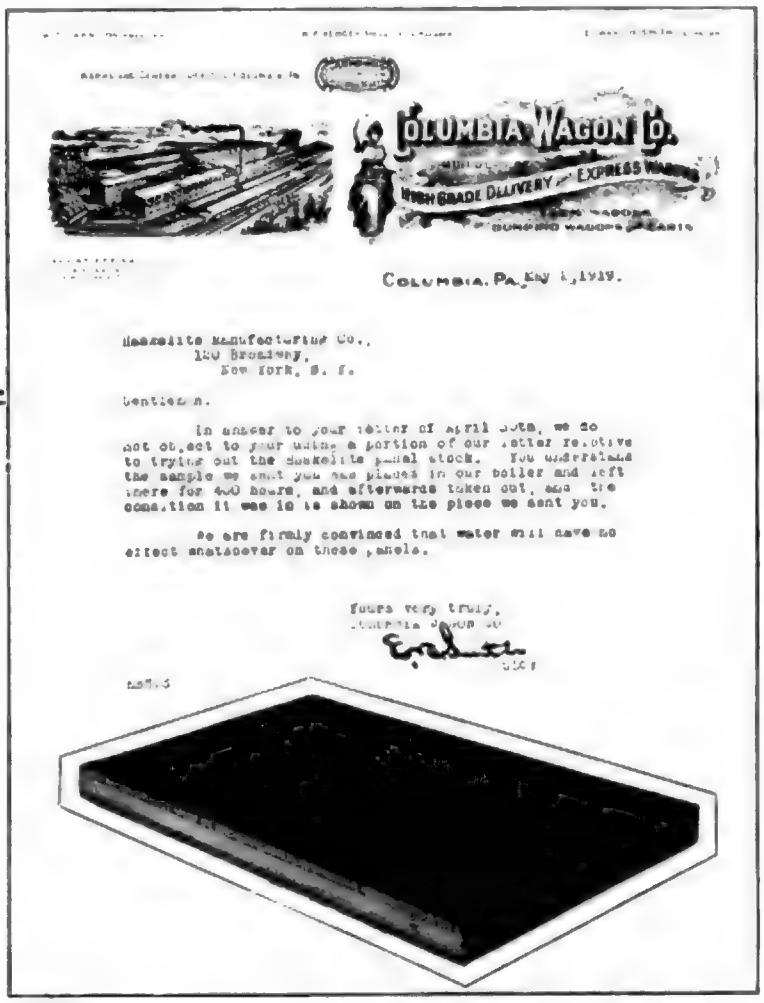
THIS is a facsimile of a page of the Dealer's Bulletin issued by the Franklin Automobile Company of Syracuse, N. Y. It is specific evidence of the practical demand by far-sighted automobile manufacturers for the only waterproof, mouldable plywood—a material which possesses the strength of steel and the elasticity and resiliency of wood. Exhaustive tests made in our laboratories have been compiled in bulletins which will be gladly issued to the body-building industry on request. These bulletins supply full instructions as to the proper use and finishing of this remarkable product.

The Waterproof

HASKELITE

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-And here's another reason why



he photographic reproon of the Haskelite panel h underwent this amaztest is one-fourth of the al size of the panel. It photographed just as it from the boiler. Four ired hours in boiling water uivalent to over sixteen of the most exacting test hich a material could be ested, exceeding in duraand severity any service which might be applied body.

Six hundred American body builders are now using Haskelite because it is the only absolutely waterproof, mouldable plywood bound with a glue which sets under heat beyond any possibility of parting. Full information of the product, sizes and prices will be furnished promptly on application to the

HASKELITE MFG. CORPORATION

CHICAGO
Chamber of Commerce Building

GEORGE R. MEYERCORD, *President*

NEW YORK
120 Broadway

Factories: Grand Rapids and Ludington, Mich.

Annual Capacity Thirty million feet

Mouldable Plywood

HASKELITE

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West Leads in Car Ownership

The West leads the nation in per capita auto ownership, according to figures compiled by the bureau of publicity of the Omaha Chamber of Commerce.

The first nine States are west of the Mississippi, namely, Nebraska, California, Iowa, South Dakota, Montana, Kansas, North Dakota, Arizona and Minnesota.

Michigan, in tenth place, is the leading State east of the Mississippi.

In Nebraska there is an auto to every seven and eight-tenths people. In other words, if it were necessary for the entire population to leave the State it could be done quickly without the assistance of railroads.

The State of Utah is in twenty-fourth place.

Rank	State	Population	Autos	One to
1	Nebraska	1,353,000	173,397	7.8
2	California	3,235,000	407,761	7.9
3	Iowa	2,245,000	278,313	8.1
4	South Dakota	754,000	86,153	9.0
5	Montana	495,000	51,053	9.7
6	Kansas	1,966,000	183,271	10.7
7	North Dakota	805,000	71,690	11.2
8	Arizona	276,000	23,905	11.5
9	Minnesota	2,350,000	204,450	11.5
10	Michigan	3,155,000	262,125	12.0
11	Wyoming	197,000	16,200	12.1
12	Colorado	1,055,000	85,000	12.4
13	Indiana	2,878,000	227,160	12.7
14	Ohio	5,272,000	415,000	12.7
15	Wisconsin	2,610,000	196,844	13.2
16	Washington	1,680,000	120,593	13.9
17	Oregon	900,000	63,324	14.2
18	Nevada	124,000	8,160	15.1
19	Connecticut	1,300,000	84,840	15.3
20	Idaho	495,000	32,282	15.3
21	Illinois	6,300,000	390,000	16.2
22	Vermont	368,000	22,653	16.2
23	Delaware	220,000	12,955	7.0
24	Utah	457,000	26,208	17.4
25	Maine	779,000	44,372	17.5
26	New Hampshire	450,000	24,917	18.0
27	Maryland	1,410,000	77,583	18.2
28	Texas	4,565,000	251,118	18.2
29	Massachusetts	3,863,000	193,497	19.4
30	Missouri	3,500,000	189,305	18.5
31	New Jersey	3,050,000	154,870	19.7
32	Oklahoma	2,430,000	122,000	19.9
33	Florida	935,000	46,196	20.2
34	Rhode Isand	630,000	29,178	21.6
35	New York	10,570,000	441,183	24.0
36	Pennsylvania	8,850,000	362,961	24.4
37	New Mexico	460,000	18,000	25.6
38	South Carolina	1,640,000	60,937	27.0
39	Georgia	2,915,000	97,293	30.0
40	Virginia	2,250,000	72,228	31.0
41	Tennessee	2,323,000	65,000	36.0
42	Kentucky	2,435,000	65,825	36.9
43	West Virginia	1,435,000	38,750	37.0
44	North Carolina	2,485,000	62,072	40.0
45	Louisiana	1,855,000	40,000	46.4
46	Alabama	2,360,000	46,171	51.0
47	Arkansas	1,810,000	28,862	62.7
48	Mississippi	1,985,000	11,792	168.0

Make your money "work or fight." If it is not fighting for you in the industrial field, put it to work in War Savings Stamps.

The Late A. J. Miller

Allie J. Miller, head of A. J. Miller & Co., Bellefontaine, Ohio, passed away at Grant Hospital, Columbus, Ohio, on Thursday afternoon, June 26th, after an operation to relieve complications caused by a malignant



The Late A. J. Miller

goitre. Mr. Miller was a man of splendid physique and had hitherto enjoyed the best of health.

On June 24th, Mr. Miller, with members of his family, motored from Bellefontaine to Columbus, to prepare for the necessary operation, which took place two days later with fatal results. His wife and daughters were present at the hospital when he passed away.

Deceased was born in Bellefontaine and resided there all his life, with the exception of a few years at Piqua, Ohio, but the business he established was known throughout the United States. He learned the carriage trade with his father, who founded the Miller Carriage Co., a pioneer business of the city. Mr. Miller later founded the firm of A. J. Miller & Co., manufacturers of carriage woodwork.

With the advent of the automobile Mr. Miller began to manufacture motor car bodies in both wood and metal and added the latest machinery for this work. His factory turned out some of the finest hearses and ambulances made in this country, which were sold in almost every State.

Mr. Miller was devoted to his home and family and built for them a handsome home, which to him was the best place on earth. He was a church member, and was affiliated with several fraternal orders. He was an energetic and upright business man and a gentleman in every sense of the word.

New Principles in Tire Making

The Thermoid Rubber Company, Trenton, N. J., has issued a very attractively prepared book with the title, "New Principles in Tire Making". It consists of thirty-two pages and cover, with about forty illustrations. The book contains much information about rubber tires, the materials that enter into tire making and the part that scientific research has played in perfecting a very essential part of the modern motor car. Ask the company for a copy of this worthwhile piece of trade literature.

W. J. R. Alexander, former secretary of the Cincinnati Carriage Makers' Club, who sailed for South America in February in the interests of his firm, Beckwith-Chandler Co., varnish makers, of New York, is expected to return within a few days. Mr. Alexander had a very successful trip.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

POSITION WANTED by man with experience as manager or superintendent of auto body plant. Address "380," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—Position as body-room foreman or inspector. Fifteen years experience, practical mechanic, reference furnished, open for engagement September 1st. Address "375," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—Draftsman for commercial auto body work. Address LOCK BOX 79, Mifflinburg, Pa.

WANTED.—EXPERT BODY DESIGNER and production man, good education and personality, honest and progressive, with a disposition to get along in a large organization. Middle West. Address "385," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—Automobile trimmers, body builders, assemblers, glass men and painters. Address "350," care THE VEHICLE MONTHLY, Philadelphia, Pa.

WANTED—Experienced automobile body builder; one who can assist foreman of wood shop in laying out working draft. Address BRUNN & CO., 980 Ellicott St., Buffalo, N. Y.

WANTED.—One trimmer and one commercial body builder to invest a small amount. Good location in a New England city of 125,000. Address "360," care THE VEHICLE MONTHLY, Philadelphia.

FIRST-CLASS TRIMMER WANTED.—We have an opening for a high-class experienced coach trimmer. We want a man who can take full charge of trim shop as soon as accustomed to our plant, which is new, with working conditions ideal. Please state salary expected to start, nationality, age and general experience and ability. Address MICHIGAN HEARSE & MOTOR CO., Grand Rapids, Michigan.

BODY MAKERS WANTED.—First-class body makers wanted for high-class closed automobile body work. We prefer custom builders. Highest wages, steady work, ideal working conditions, no labor trouble. In answer please state age, nationality, and how soon you could start work. Address MICHIGAN HEARSE & MOTOR CO., Grand Rapids, Michigan.

AUTOMOBILE BODY DRAUGHTSMEN. BREWSTER & CO., QUEENSBORO BRIDGE PLAZA, LONG ISLAND CITY, N. Y., REQUIRE SEVERAL EXPERIENCED MEN ON AUTOMOBILE BODY DESIGN.

BODY ENGINEER wishes position with automobile factory as designer and draftsman of bodies, familiar with custom work, also large production. Good experience as factory manager. Address "370," care THE VEHICLE MONTHLY, Philadelphia.

TRIMMER FOREMAN.—Wishes to make change. Have had 17 years' experience on high-grade work. Can furnish good reference. Address "315," care THE VEHICLE MONTHLY, Philadelphia.

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Trailmobile

Trade-Mark Reg. U. S. Patent Office

The Motorless Motor Truck

Thousands in Use

DIVISION 1
Light four-wheeled Trailmobiles for use with passenger cars or light trucks: 1,250 lbs., 1,500 lbs. 2,000 lbs.

DIVISION 2
Heavy duty, four-wheel Trailmobiles for use with trucks: 3,000 lbs. Non-reversible; 4,000 lbs., 7,000 lbs., 10,000 lbs., Reversible.

DIVISION 3
Trailmobile Semi-trailers: 3,000 lbs. 6,000 lbs., 10,000 lbs.

Bodies for every business

Why the Profit is Good!

THE Trailmobile is the best trailer mechanically, the best known and best advertised one.

The line is most complete, including light Trailmobiles, heavy reversible four-wheeled Trailmobiles, and semi-trailers.

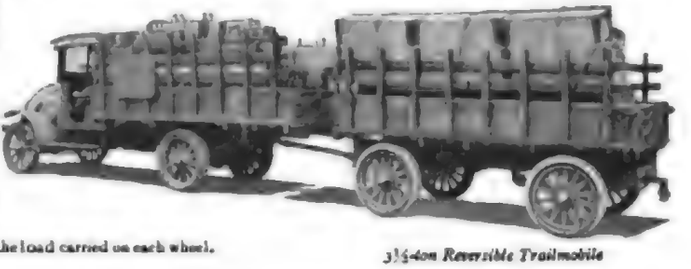
The dealers margin is about the same as that on the leading trucks. There is practically no service expense after the sale. So few replacements are required no stock of spare parts need be carried.

The dealers profits from Trailmobile sales are real profits. The line costs little to handle.

Write for literature and dealer's proposition.

The Trailmobile Company
502-522 E. Fifth St.
Cincinnati, Ohio

Contractors to the United States Government



3½-ton *Reversible Trailmobile*

Good roads are preserved by reducing the load carried on each wheel.

FORGINGS

OF GUARANTEED ACCURACY

For Automobiles, Motor Trucks and Special Work

We also make a large line of Drop Forged Carriage and Wagon Hardware

OUR MOTTO:
HIGH GRADE WORK AND PROMPT SERVICE

Send your Models or Blue Prints for Quotations
Write for our Latest Catalogs

RICHARD ECCLES COMPANY

FOUNDED 1880

AUBURN, NEW YORK

AUTO REPAIRING SIMPLIFIED



Ordinarily it's no cinch to repair a broken crank shaft, but a real job can easily be made of it by use of

LAFFITTE Welding Plates

They weld iron and steel at a low heat, saving one-third in time, fuel and labor. So thoroughly do they perform the work that a break will never occur in the weld. There are hundreds of uses to which these welding plates may be put.

HANDLED BY ALL ACTIVE DEALERS
SAMPLE UPON REQUEST

The Phillips-Laffitte Co.
Pennsylvania Building Philadelphia, Pa.

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All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Beam Patent Power Take-off.

Dealers and truck owners should insist that all trucks purchased with power take-off do not infringe B. A. Gramm's Beam Patent, No. 1194994.

A Transmission Which Simply Defies Trouble

If there were no other reason for preferring Gramm-Bernstein trucks, B. A. Gramm's transmission alone would be reason enough.

Think of the expensive things which **can,** and **do** happen every day, to truck transmissions. Then note that **not one** of them can happen to ours.

Eighteen years of truck experience have shown us how to cure the one great and expensive transmission fault.

The Gramm-Bernstein gears are never shifted —hence they cannot possibly be clashed or ground or chipped.

Speed changes are made by means of patented dog clutches—strong and tough and sturdy.

These clutches enable easy shifting at any time and into any speed, going fast or **slow, up** or **down hill.**

This is especially valuable in hilly sections. The driver can use engine compression for braking—thus saving much wear and expense on brakes.

The gears are mounted on extra large bearings. **They revolve on a heavy six-spline shaft.** They simply cannot get out of alignment.

In the entire transmission assembly, for example, there is not a single pin, stud, set-screw, bolt or key which by any chance could work loose and fall out with resulting serious damage to the entire gear set.

This transmission is basic superiority. It goes to the very root of truck value and truck service. It is one of the factors contributing to the continuous hauling and the consequent economy which distinguish Gramm-Bernstein records.

Gramm-Bernstein worm-drive trucks are made in 2, 2½, 3½ and 5-ton capacities—sold with complete equipment, at a flat price. Ready for the body—not an extra to buy.

The 2-ton chassis, equipped, at $2700, is under the average of prices asked by 61 manufacturers for 2-ton chassis without equipment

The Gramm-Bernstein Motor Truck Company

Lima, Ohio U. S. A.

Pioneers since 1901—Builders of the First Liberty (U.S.A.) Truck

GRAMM BERNSTEIN

PROTECTED BY UNITED STATES PATENTS
June 29, 1915
Aug. 17, 1915
Mar. 14, 1916
Feb. 20, 1917



WE DON'T want to harp on mileage guarantees, but it is a fact of undoubted interest that in addition to offering greater traction and greater resiliency, Kelly Caterpillars are guaranteed for 15,000 miles.

KELLY-SPRINGFIELD TIRE CO.
Gen'l Sales Dept., 4614 Prospect Avenue
CLEVELAND, OHIO

KELLY SPRINGFIELD TRUCK TIRES
CATERPILLAR TREAD

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IT BRINGS BUSINESS

Body Builders will find users of dumping trucks very enthusiastic over a demonstration of the

TRADE HORIZONTAL HYDRAULIC MARK **Dumping Unit**

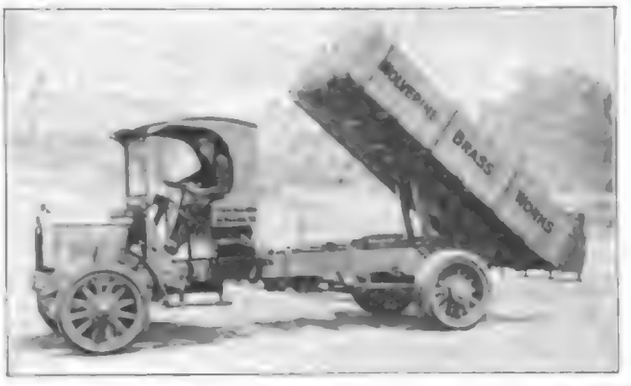
Get an agency and secure two profits—a very liberal one on the Unit and your regular profit on the body which you can build

The Horizontal Hydraulic Dumping Unit enables full length bodies to be used, the usual 18" of waste loading space just back of seat being saved.

No ropes, rope clips or sheaves required. No interference with ground clearance of chassis.

No portion of hoist higher than chassis seat.

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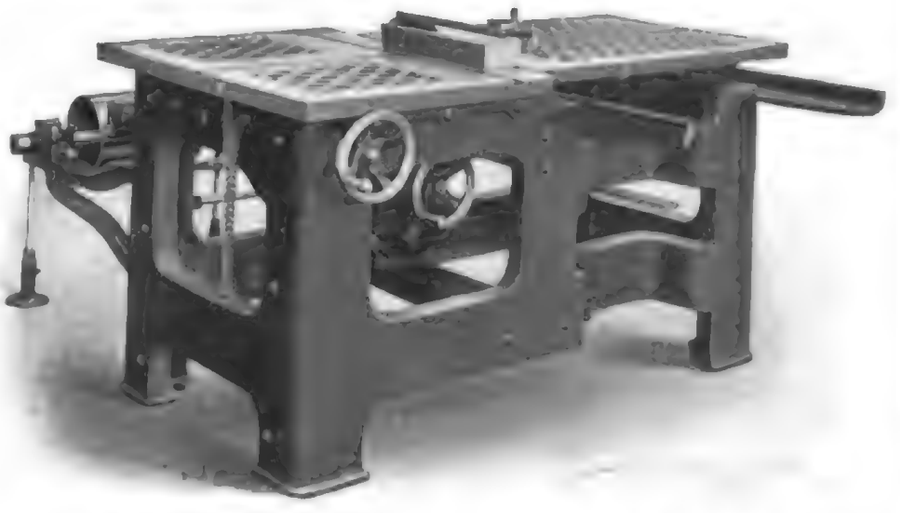
HORIZONTAL HYDRAULIC HOIST CO.
456 Book Building
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BEVEL AND MITRE SAW HEAVY TYPE

This machine is the latest development of a Bevel and Mitre Saw. It has 50 per cent more power than our Regular Saw. The frame is strong and massive with offset constructed in it to allow operator to follow the work.

An essential machine in all automobile, carriage, furniture, and woodworking factories.

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PETTINGELL MACHINE COMPANY
AMESBURY, MASSACHUSETTS



Their Advantages—

Save time and labor in hanging doors.
Insure flush joints and clean lines.
Make greater clearance than ordinarily possible.
Are exceptionally strong. Prevent lateral movement.
Can be quickly detached.

SOSS MANUFACTURING COMPANY
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Hand Hoist for Ford Truck

(Patents Pending)

TAKES no room back of cab, is easy of operation, simple and neat in appearance.

Shipped on sub-frame, ready for mounting on chassis. Easiest for the body builder to install and best—because it always makes a satisfied customer.

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Truck Engineering Company
7031 Broadway
CLEVELAND, OHIO

Get the Idea of the Martin Method



A horse cannot carry more than ¼ ton



But can easily pull a ton



A runabout will soon break down under a ton strain



But the same runabout can easily pull 2 to 3 times its carrying capacity

THE MARTIN METHOD multiplies the load-carrying capacity of the automobile three fold.

THE MARTIN METHOD is based on the famous Martin Rocking Fifth Wheel, which makes the connection between the motor chassis and the Semi-Trailer.

THE MARTIN METHOD combines perfect steadiness with the necessary amount of flexibility.

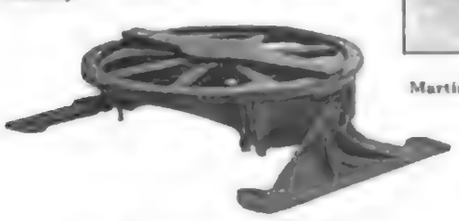


Martin Fifth Wheel and Rear End Assembly shown in relief

THE MARTIN METHOD makes a very small investment bring your motor truck up to date, and with increased load-carrying capacity.

THE MARTIN METHOD is immediately available. We supply parts or Semi-Trailers complete.

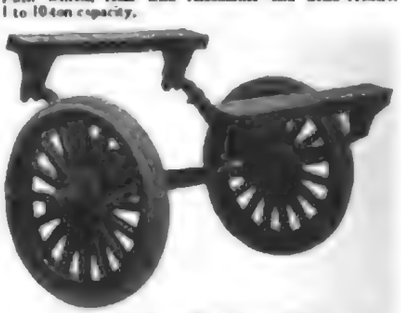
Write for our interesting and fully priced catalog showing Fifth Wheels, Rear End Assemblies and Semi-Trailers, 1 to 10-ton capacity.



Martin Patent Rocking Fifth Wheel

MARTIN ROCKING FIFTH WHEEL CO.
P. O. Box 1244-f SPRINGFIELD, MASS.

Manufacturers of Martin Rocking Fifth Wheels, Semi-Trailers, Semi-Trailer Parts, Rear End Assemblies, Floating Bearing Axles, Castor Jacks

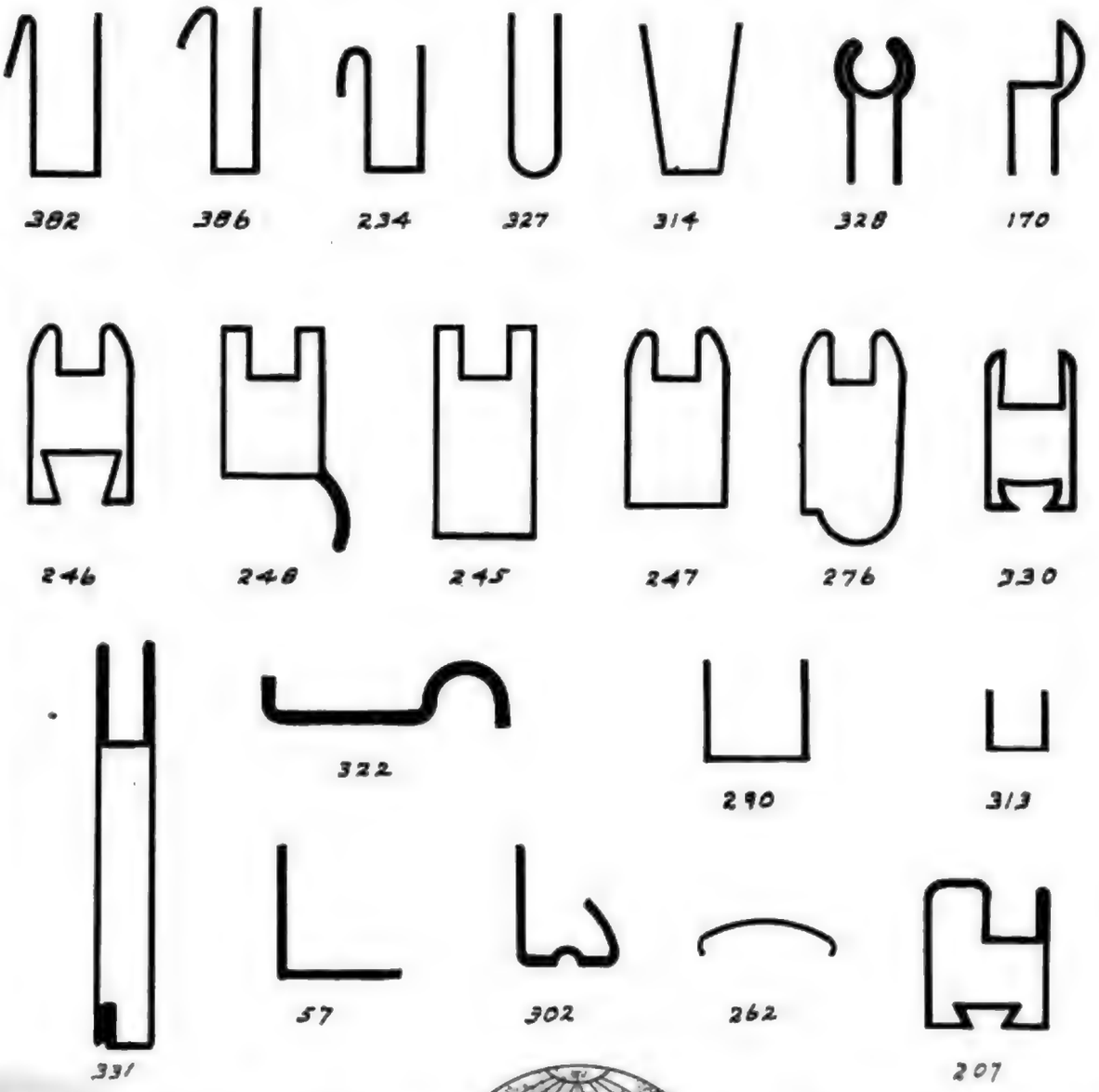


Martin Rear End Assembly

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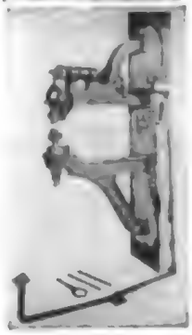
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"QUICKWORK" MACHINERY

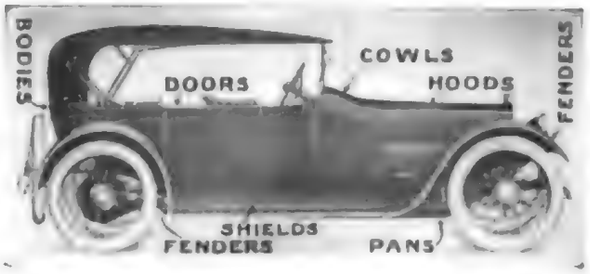
MAKES ALL THE SHEET METAL PARTS OF AUTOMOBILES

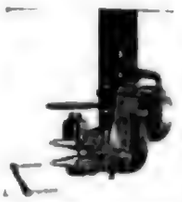


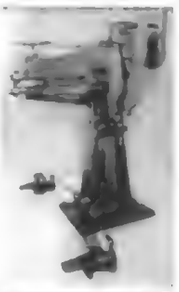


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Do first-class work with second class help, and do things not possible with any other equipment. Large production manufacturers use them because they turn out the LARGEST VOLUME at the LOWEST COST; and high-grade custom manufacturers use them because they do the BEST work.

"QUICKWORK" Machines have become standard, replacing ordinary equipment throughout the world. There are over 30 different "QUICKWORK" Machines—the most complete, uniquely—effective, cost-reducing, quality—improving line of sheet metal working machinery in existence.

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TRADE S.W. MARK

Specialties

in Steel

Suggestion No. 1. In this series will be shown a variety of articles that have been manufactured by The Special Productions Department, that each of the articles may suggest to you other possibilities of this department as applied to your product.

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The outstanding features of this auto hinge are that it is concealed; demountable (the doors can be easily taken off); very simple in construction and made of heat treated steel. These are not usually carried in stock but will be made to order in different sizes.

May we quote in detail? Refer to Dept. V. M.-1

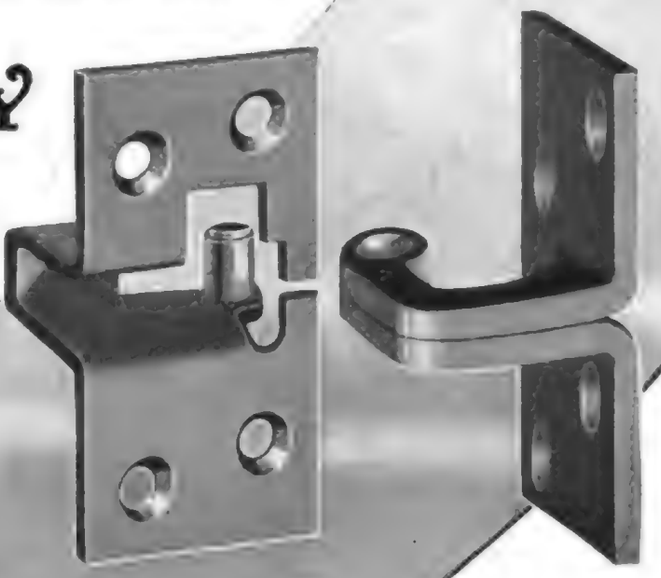
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THE STANLEY WORKS

NEW BRITAIN, CONN.

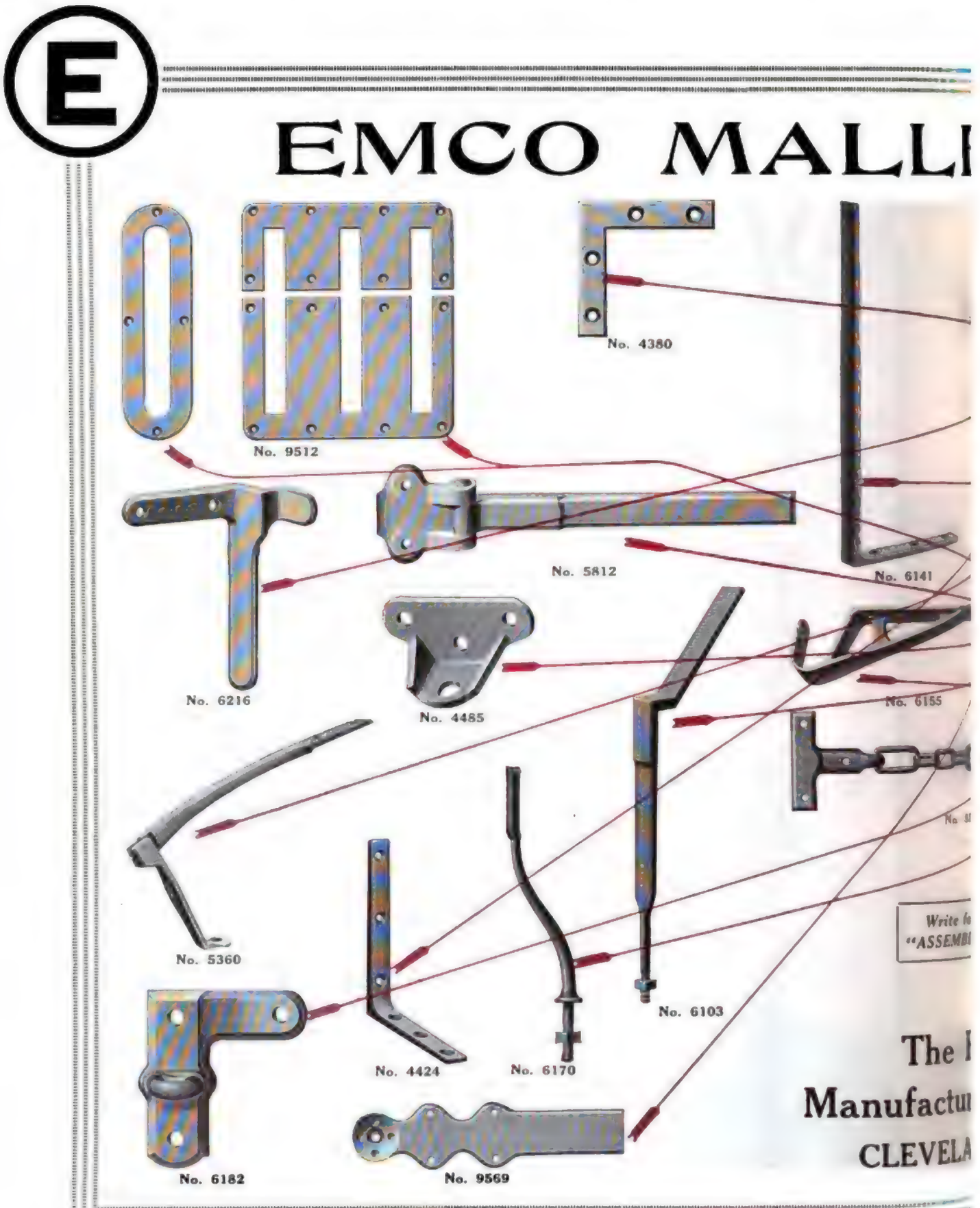
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The Stanley Works is the largest and oldest manufacturer of wrought steel hardware in the world



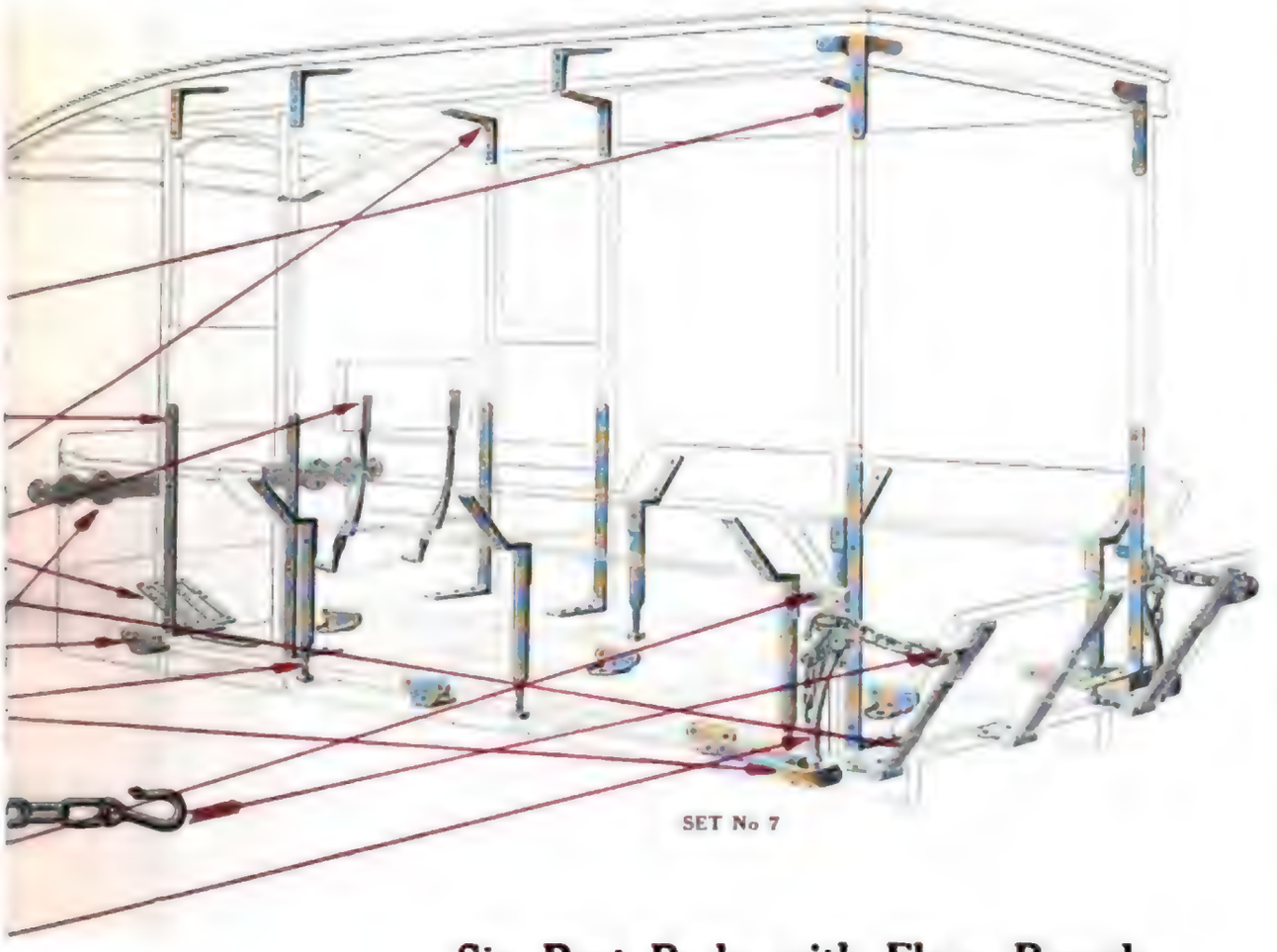
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More than 7 million Flutter Valve Guards for Gas Masks were made by us for our Government during the war.



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Six Post Body with Flare Boards

IRONS NEEDED IN THE CONSTRUCTION OF THIS BODY.

Size A, 10" Side Panel			Size B, 12" Side Panel	
6 pieces	No. 6103-C	Body Brace and Flare Board Irons	6 pieces	No. 6103-N
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3 pieces	5812-B	Endgate Hinges	3 pieces	5812-D
2 pieces	6170-G	Body Braces	2 pieces	6170-F
1 pair	8508-A	Endgate Chains	1 pair	8508-B
2 pieces	6182-A	Body Chain Eyes	2 pieces	6182-B
1 pair	6216-C	Rear Post, Top Rail Corner Irons	1 pair	6216-C
6 pieces	4424-C	Roof Rail Corner Irons	6 pieces	4424-C
2 pieces	4380-B	Top Rail Corner Plates, front	2 pieces	4380-B
1 set	9512	Footboard Plates	1 set	9512
2 pieces	9569	Dash Lamp Brackets	2 pieces	9569
6 pieces	4485	Body and Chassis Connections	6 pieces	4485
1 pair	6155-A	Sill Braces	1 pair	6155-A
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IRONS"

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Company
U. S. A.

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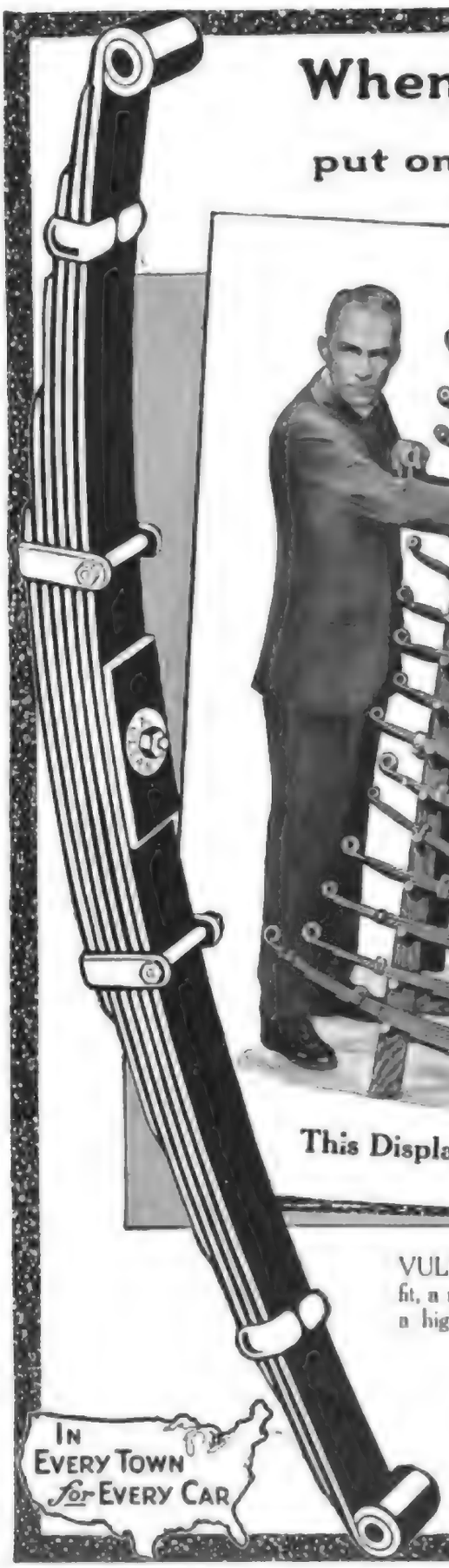
When Springs Break

put on **VULCAN**

The Replacement Spring



This Display Rack FREE with First Order



VULCAN springs represent the highest degree in quality and fit, a remarkable and growing popularity with car owners, and a highly satisfactory PROFIT for the dealer.

Write for our Proposition.

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Boston, Mass. Sumter, S. C.
Dallas, Tex. Reading, Pa.
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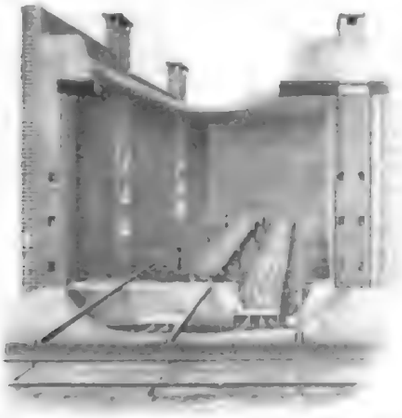
THE tally-ho or the small buggy; the dressy turn-out or the doctor's gig—it's all the same! Equip them with Firestone Tires for long, easy, good-looking service.

And *you* have the profit in light weight, the value in good-measure size and the convenience of standard design.

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Branches and Dealers Everywhere

Firestone Carriage Tires



It Dries Oak Green FROM THE SAW

Any lumberman will tell you that's proof a-plenty for the success of

THE NATIONAL DRY KILN

It also dries all other kinds of lumber, from the lightest of soft wood for panel work to heavy green hickory billets for motor truck spokes.

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THE NATIONAL DRY KILN CO.

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The Answer

TO THAT TRAILER AXLE QUESTION IS

The Concord Plain Bearing Axle

It has proven its worth in actual trailer service. Made for light, medium and heavy work.

We can deliver promptly. Write for particulars.

CONCORD AXLE COMPANY - PENACOOK, N. H.

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Body Engineer

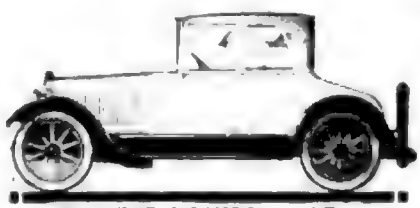
We want an expert and practical designer of high grade automobile bodies to take charge of all designing in our large, new, body factory which is to be one of the most ideally laid out and equipped plants in the country. This man must be an able designer of fine open and closed bodies—one who has had thorough and practical experience in charge of design. Please give full details when you write.

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THE LANG BODY COMPANY

MANUFACTURERS OF

Automotive Bodies



CHARLES E. J. LANG, Pres. and Treas.

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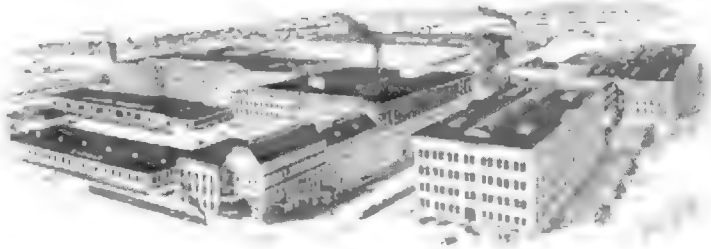


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in reasonable quantities for fall and winter delivery.

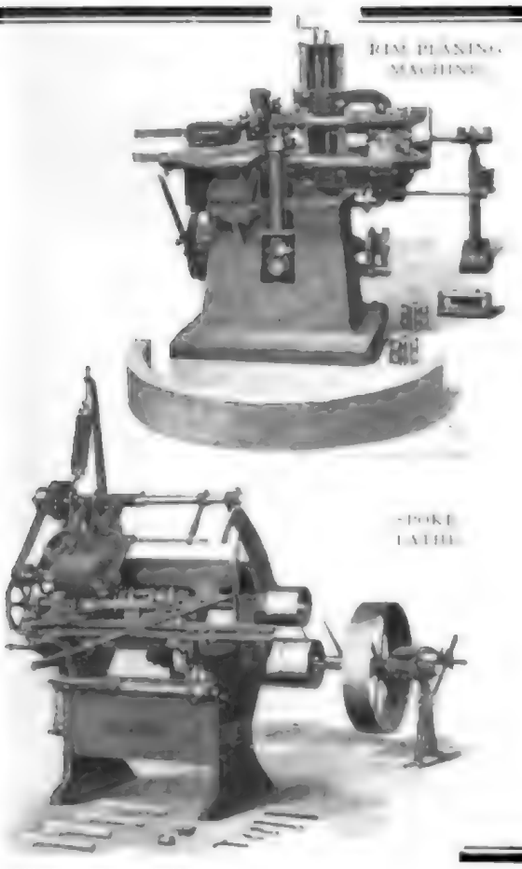


Founded in 1845, our long experience and established reputation in the manufacture of vehicle bodies guarantees our responsibility and the quality of our work.

H. H. Babcock Company — **Watertown, New York**

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DEFIANCE

Production Wheel Machinery

The fact that Defiance production wheel machinery is largely in use in nearly every wooden vehicle-wheel factory throughout the world, makes the name "Defiance" synonymous to wheel machinery —and it proves that these machines have met wheel makers' requirements in producing wheels of a high standard of quality, at a low production cost.

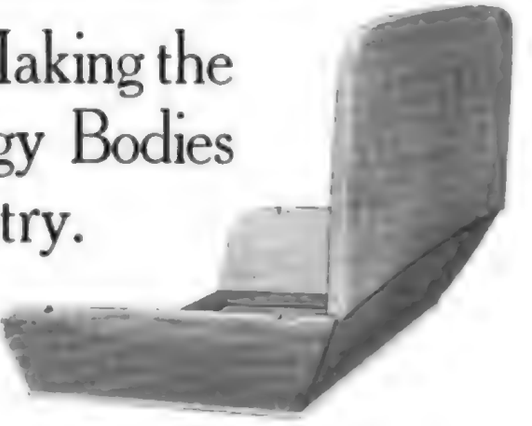
There's a Defiance machine for every operation necessary to make wooden hubs, spokes and rims—to assemble and finish wheels of all kinds for farm wagons, automobiles, motor trucks, carriages, artillery, etc. Each machine has been designed for a special purpose, and to perform its respective operation accurately, with a minimum material wastage, and at a high rate of production.

The Defiance Machine Works

DEFIANCE ***OHIO*** ***U. S. A.***

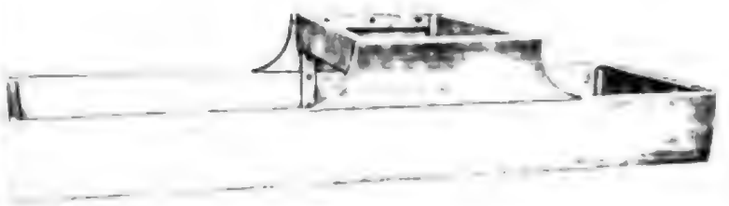
NEW YORK ***LONDON***

We Have the Reputation of Making the Best Automobile Bodies, Buggy Bodies *and* Buggy Seats in the Country.



Our Products are Quality. Deliveries Always Prompt and Our Prices Attractive

We Solicit Inquiry and Will Quote Promptly



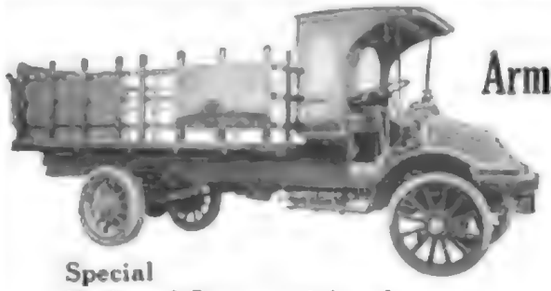
Ames Body Corporation

INCORPORATED

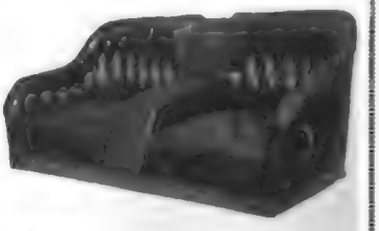
Successor to CARRIAGE WOODSTOCK CO.

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Armstrong-Johnston Mfg. Co.
COLUMBUS, OHIO





Special
Designed Commercial and Pleasure Car Bodies
Send blue prints and specifications for estimates

TRUCK SEATS
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CAB TOPS

Wheels for Trailers and Automobiles
Hickory Nut and Acorn Brands

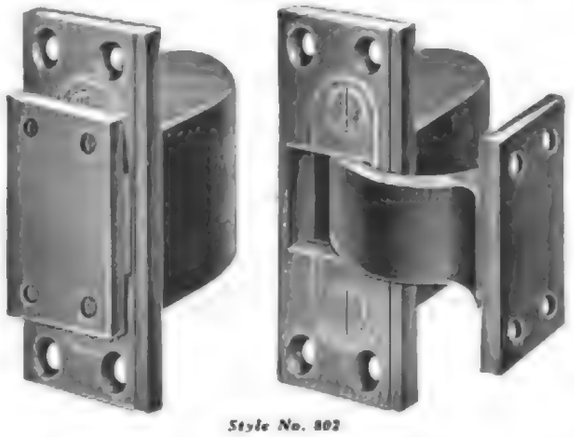


Medium and Heavy Sarven with Tires.
Artillery types—Light to Heaviest sizes with Steel or S. A. E. Bands.

Noted for quality, workmanship and seasoned stock.
Prices quoted on receipt of full specifications.

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About Concealed Hinges

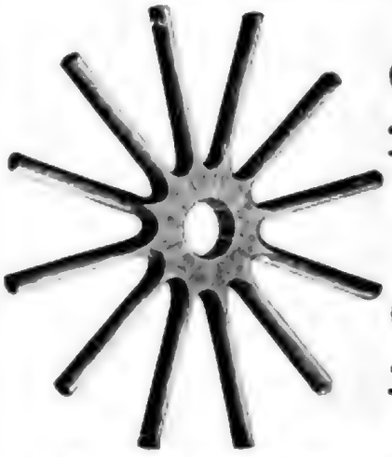


Style No. 802

WE HAVE manufactured for years a Concealed Hinge with drop forged steel hook, and a drawn brass non-rusting case. One of our designs is shown in the accompanying illustration, and we desire to inform the trade that all Concealed Hinges we make are fully protected under U. S. Patents owned by us. We will protect all users of our Automobile Door Concealed Hinges, or for that matter on any other goods which we may manufacture and offer to the trade.

The English & Mersick Company
New Haven, Conn.

Motor Wheel Repairing
Made Worth While by

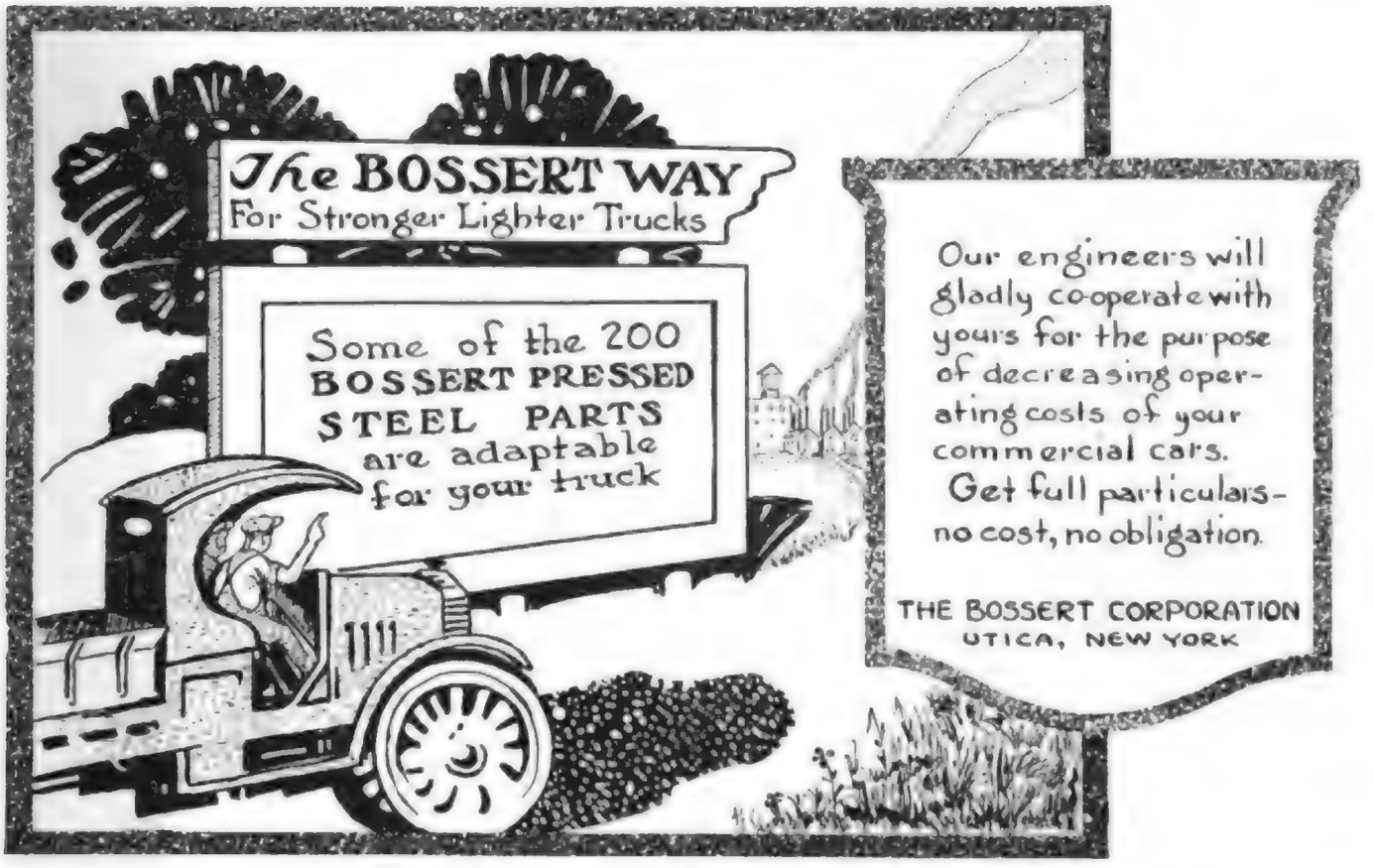


SCHWARZ WHEEL SPIDERS

They eliminate the nuisance of taking out damaged spokes and inserting new ones.
Just apply felloes and metal rim and job is complete.

Write for Further Particulars and Prices

SCHWARZ WHEEL CO.
FRANKFORD, PHILADELPHIA



Porter's BOLT CLIPPERS

THE BEST



"EASY" Nos. 1 and 2 — Parts always to be had

"NEW EASY" Nos. 0, 1, 2, 3 — Porter's name on all genuine tools

H. K. PORTER Ashland St., **EVERETT, MASS.**

Campbell & Dann Manufacturing Company

Solicits your orders for

SHAFTS AND POLES

Ironed or Unironed

Gears, Buggy and Auto Bows, Seat and Body Bendings

MIXED CAR LOADS OF ABOVE WITH HUB AND SPOKES A SPECIALTY

TULLAHOMA - TENNESSEE

VENEERED ROOF PANELS

for Closed Body Construction

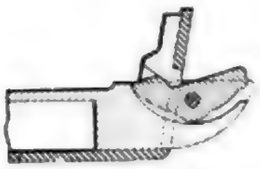
GLUED WITH WATERPROOF GLUE or HIGH GRADE HIDE GLUE

Wagon Side Panels
Dash Boards Marqueterie Panels

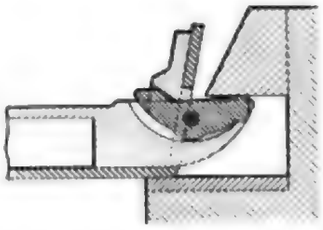
ROOF PANELS MADE WITH FIFTEEN DIFFERENT SWEEPS IN LENGTH AND WIDTH

NEW JERSEY VENEER CO.

PATERSON, N. J.
U. S. A.



Shows the extreme position of the expanding member and the latch bolt when door is open.



Shows the expanding member in contact with the inner bearing surface of the striker and having taken up all the clearance between it and the door stop when door is closed.

"SEARS-CROSS LOCK"

FOR AUTOMOBILE DOORS

"The Lock With the Expanding Latch"

(Manufactured under the Ottinger Patents)

It Prevents Rattling of Doors
Insures Positive Safety Protection Against Doors Opening Accidentally
Overcomes Present Difficulty in Opening and Closing Doors
and
Automatically Takes Up Wear

The outward pressure of the rubber stops is taken care of by the inward pressure of the Expanding Latch which holds the doors tight so that they cannot rattle. The holding pressure is supplied by the lock and not by the rubber stops.

The only perfect automobile door lock. Brings about economy in cost of installation. Made for all priced cars, open and enclosed bodies.

SEARS-CROSS CO.

Bush Terminal, Brooklyn, N. Y.

C. COWLES & COMPANY

New Haven Conn.

ESTABLISHED 1838

HARDWARE, MOUNTINGS AND TRIMMINGS

Everything for Limousines and Landaulettes

Rubber-Covered Handles; Ventilators; Disappearing Corner Lights; Dome and Pillar Lights; Electric Cigar Lighters; Security Locking Handles; Concealed Toilet Cases; Curtain Rollers; Speaking Tubes; Mechanical Window Lifts; Anti-Rattlers; "Banner" Window Locks; Tail Lights; Filled Mouldings etc.

CURTAIN FASTENERS—All styles and finishes.
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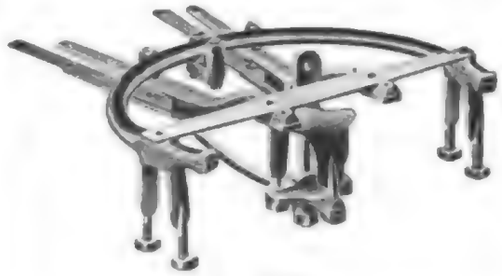
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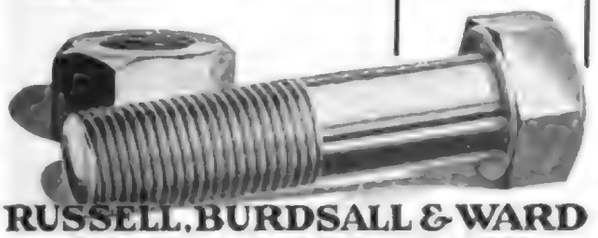
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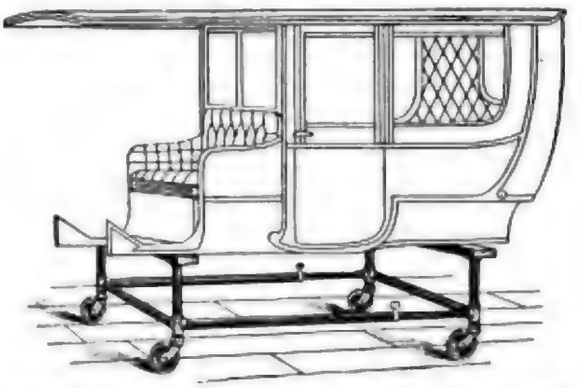
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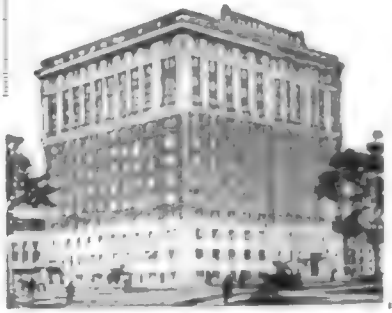
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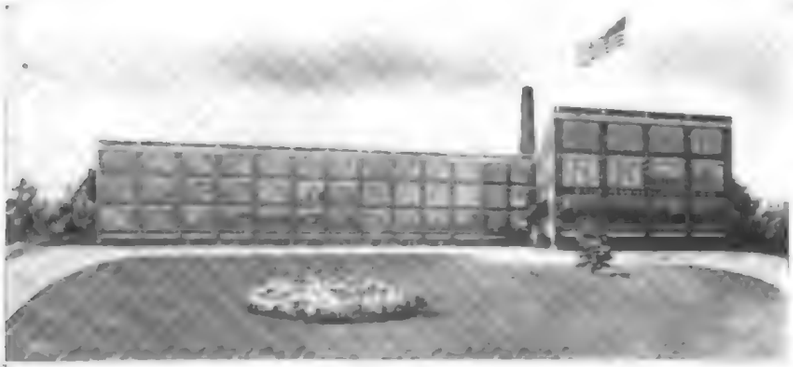
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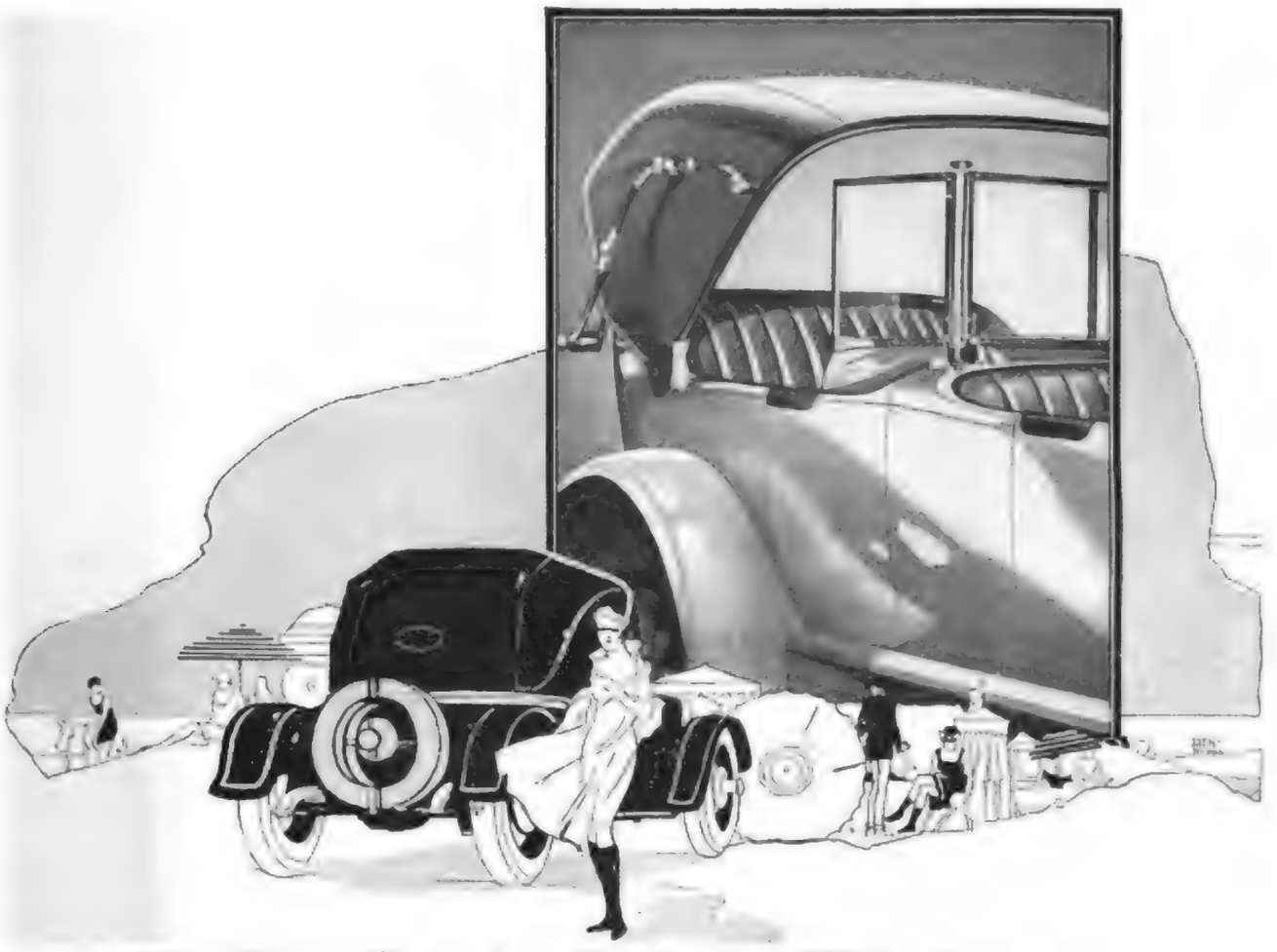
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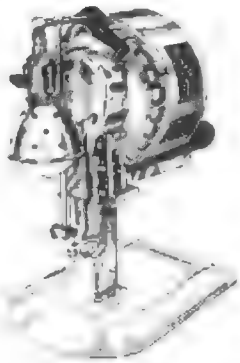
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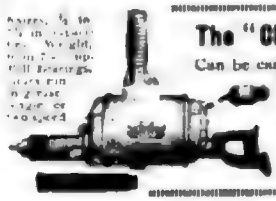
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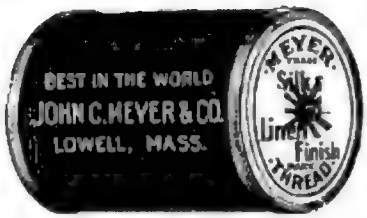
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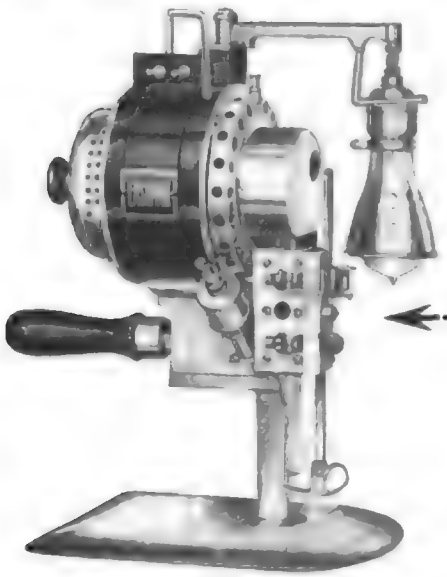
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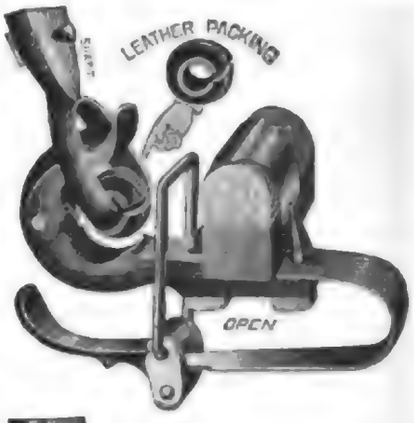
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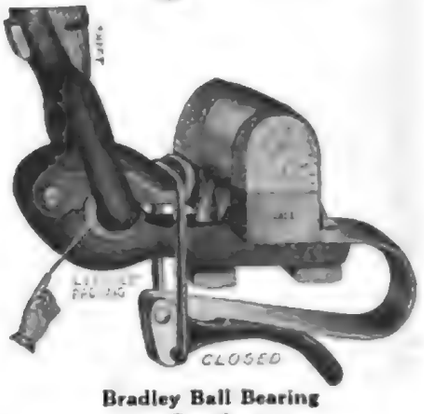
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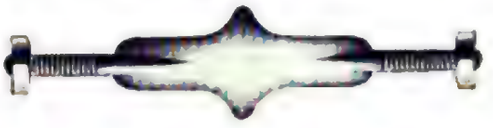


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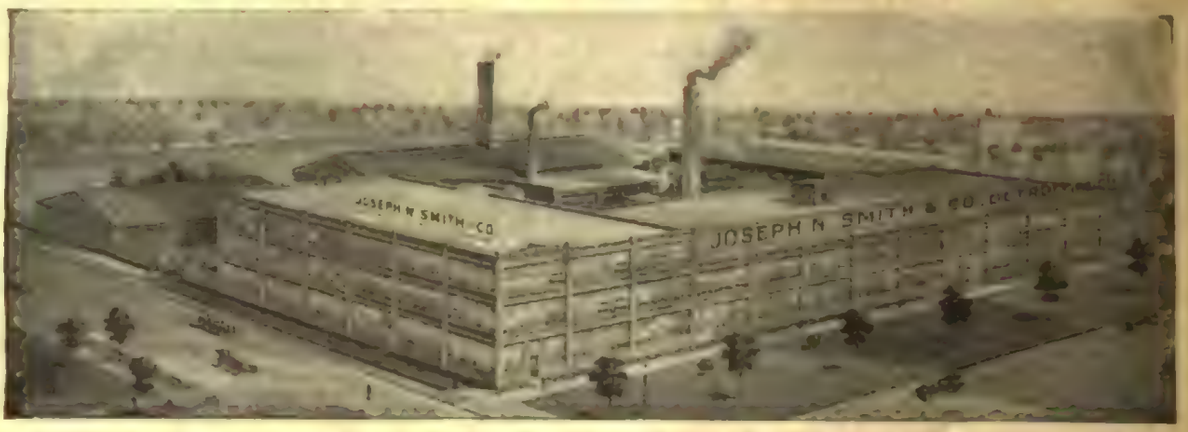
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VOL. 55—No. 6 SEPTEMBER, 1919

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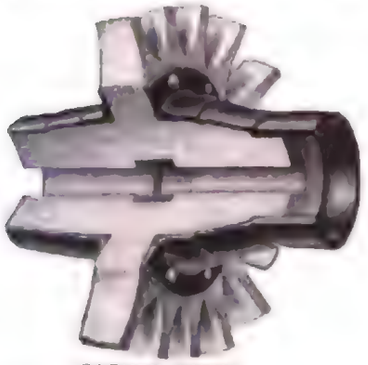
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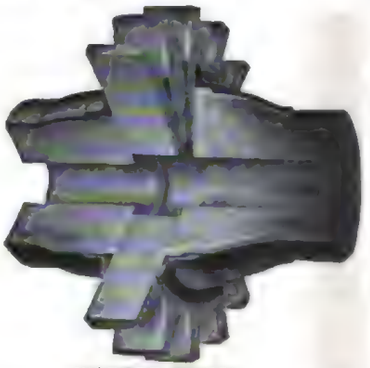
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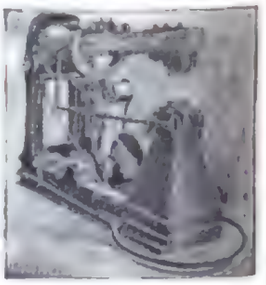
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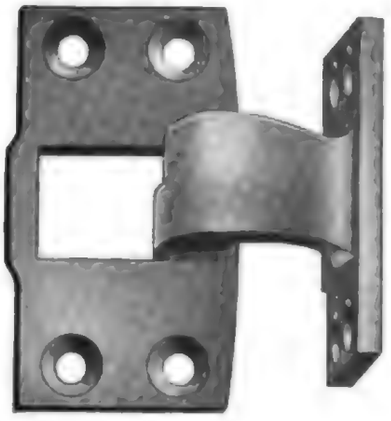
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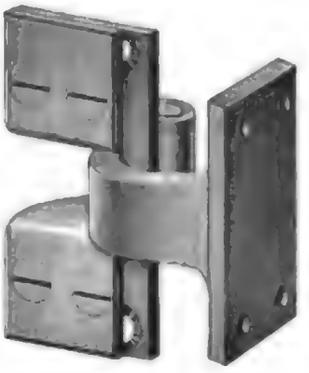
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No. 39



No. 41

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PUBLISHED FOR 54 YEARS AS

THE MAGAZINE FOR VEHICLE MANUFACTURERS

Published Monthly by
WARE BROS. COMPANY, PUBLISHERS AND PROPRIETORS,
1010 ARCH STREET, PHILADELPHIA, PA.

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THE VEHICLE MONTHLY is a member of the A. B. C.

Vol. 55, No. 6 **PHILADELPHIA, SEPTEMBER, 1919** **Subscription Price $2.00 Per Year**

The Need of Trade Education

The National Master Wheelwrights', Coach and Motor Body Builders' Association of Great Britain, held its annual convention at Birmingham, England, on Friday, June 27th. From the report of this meeting, which reached our desk a month after it occurred, we reprint a suggestion relating to the education of apprentices in the body building trades. The suggestion is from a Mr. Davis, of Bristol:

"The labor difficulty, the shortage of skilled hands was to some extent the result of the decline of the apprenticeship system. He would like to see it in full swing again. The best encouragement to an apprentice is for him to find that the shop he is engaged in is qualified to teach him his trade by an effective scheme of training whereby an apprentice should be expected to pass a test of efficiency each year before passing into a second year. This would set up a competition amongst the apprentices.

Why Apprentices Become Discouraged

"Experience in the past showed a lad leaving school and entering the trade is full of enthusiasm for six months, but owing to being put at dirty and menial work, he looses heart until about the last year of his apprenticeship, when he thinks he ought to be getting on. It is then too late to become a skilled workman, and he is turned out unsatisfactory, and generally drifts into other employment.

"I was very much interested in the method adopted in training the girls in the Training Factories set up by the Ministry of Munitions all over the country. A book of blue prints was compiled showing the progressive stage of work to be done, from the turning of a pin to the making of a propeller, and some very fine work has been done by girls with less than six months' training. If some such methods could be set up for the training of apprentices better results and quicker returns would be made.

"Headmasters of schools and parents of children could be encouraged to recommend the coach-building industry to the young. These training factories I have referred to are now being used for the training of sailors and soldiers discharged from the Service, and we should encourage the Minister of Labor in extending these centres for making good the present drought of labor.

"The best encouragement of apprentices into the industry lies mainly in making our own shops a technical school of instruction. I wish to propose 'That it be an instruction to the Executive Committee to compile a set of questions and issue of blue prints showing the kind of work to be expected from apprentices in each year of their training in the respective branches of the industry.'"

The chairman suggested that each branch submit to the Executive Committee what in their opinion would be the best possible scheme for the future of apprentices. The Executive Committee could then utilize the collective wisdom of the employers throughout the country in formulating a scheme. The suggestion was accepted by the Conference.

Judging from the large number of inquiries relating to technical education that have come to our office since the close of the war, it seems that here in America we also need to look very closely into the question of apprentice education.

These inquiries, as a rule, come from ambitious young men who wish to know where they can learn vehicle body drafting and the theory and practice of design. It is with regret that we have to tell them that virtually all of the few schools once in existence have ceased to be.

As the English body builder suggests in regard to Great Britain, so we would urge upon American body builders, that in every large shop provision should be made for teaching designing, drafting and construction, through a regular course conducted by a competent and experienced teacher. In larger towns and cities where several shops are located, surely there can be found some way for their proprietors to unite in a plan for an evening school where trade principles would be taught.

An Example from Another Industry

The printing and publishing trades in many large cities conduct technical schools in the art of printing, as well as in estimating, cost finding and salesmanship, and most of these schools have been successful In some instances the courses have been installed in already existing manual trades schools where the instruction is under the supervision of the local employers' association. What has been done by the printers can be done as well by the body builders' associations, if they could be sufficiently impressed with the benefits accruing from such schools and classes.

As a matter of fact vehicle body builders' associations, notably in St. Louis, Cincinnati and Philadelphia, dd, a few years ago, organize technical classes in their respective cities, but the beginning of the war took so many young men away that in all these cities the schools were either suspended or are running on such a small scale that we hear nothing of their work. In Philadelphia the school was conducted jointly by the local association and the Y. M. C. A., but at the beginning of the war the school rooms were so badly needed for war work classes that the Y. M. C. A. suggested a suspension of the vehicle drafting school. At this writing the class has not been reorganized.

Another school that is badly missed is the one formerly conducted by the Carriage Builders' National Association, which was taken over by an automobile manufacturers' association and abandoned by them after a comparatively short period. All that is left of this excellent institution is the correspondence department, now carried on by Prof. Andrew Johnson from his home in

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Grey, Maine. Prof. Johnson was the principal of the New York school for many years.

"Vehicle Monthly" Drafting Course

THE VEHICLE MONTHLY has endeavored to accomplish something for the cause of technical education by publishing a lengthy series of lesson charts, covering both horse-drawn and motor-propelled vehicle bodies, which are designed for the use of classes as well as for individual study. Two pages each month have been devoted to these charts, which have been appearing in serial form in THE VEHICLE MONTHLY for about two years. We have reason to know that a good many men are following these lesson charts regularly, not only in the United States, but also in Canada, England, Australia and New Zealand. The charts are also furnished as a complete series, each chart printed on a separate sheet of heavy paper, making an excellent course for use in trade schools.

Need for Trade Education Greater Than Ever

Now that the war is over, our young men returned to their former occupation, and the need for technical education greater than before the war, it seems the time is fully ripe, not only for a resumption of activity in the schools that existed in the *ante-bellum* period, but for the organization of many more schools in cities and individual shops which have never enjoyed the advantages of trade education

Government Thrift Stamps a Permanent Institution

The Treasury Department intends to make the issue of government savings securities a permanent institution, Secretary of the Treasury Glass has announced. Secretary Glass, by his announcement, makes it clear that the sale of Thrift Stamps, War Savings Stamps, and Treasury Savings Certificates is to be continued not only as an effective means of financing the government and creating the vast amounts of new capital now needed for industrial and trade development, but also as a means of making thrift and saving a permanent American habit.

Secretary Glass's announcement was made in reply to an appeal from the National Education Association for the continuance of the sale of thrift securities in order to enable the schools of the country to make permanent the educational movement for thrift.

The Secretary says that it is the intention of the Treasury to continue and make permanent the War Savings movement and to continue the sale of Thrift and War Savings Stamps and Certificates.

Announcement of this financial policy on the part of the Government has come in response to a widespread demand from both employers and employes. Each has been quick to see the advantages presented both by the popularizing of habits of thrift and investment in safe and profitable and guaranteed securities. Both employers and employes have pledged wide cooperation and support in the Government movement

Roosevelt Memorial Association

The Roosevelt Memorial Association has been formed to provide memorials in accordance with the plans of the National Committee, which will include the erection of a suitable and adequate monumental memorial in Washington; and acquiring, development and maintenance of a park in the town of Oyster Bay which may ultimately, perhaps, include Sagamore Hill, to be preserved like Mount Vernon and Mr. Lincoln's home at Springfield

In order to carry this program to success, the Association will need a minimum of $10,000,000, and so that participation in the creation of this memorial fund may be general, it asks for subscriptions thereto from millions of individuals.

Colonel Roosevelt was among the greatest Americans of his generation He blazed the trail which this nation must travel Unselfish and sincere in purpose, unswerving in seeking the right and following it, definite and direct in action, with his theory of personal responsibility for wrong-doing and his creed of "the square deal" for all, he gave a lifetime of devoted public service which must stand as an inspiration to the youth of this land for many years Ardently American, believing profoundly that only through fullest acceptance of America's privileges and responsibilities could the people of this country realize their highest well-being and fulfill their obligations to themselves and to humanity, he set up ideals which it is not only a duty but a privilege to follow.

A memorial to this man will not so much honor him as honor America and the citizens who raise it to him. A contribution to the Roosevelt Memorial will be, in the highest sense, a pledge of devotion to ideal citizenship Checks may be sent to Albert H. Wiggin, Treasurer, Roosevelt Memorial Association, 1 Madison Avenue, New York City.

WILLIAM BOYCE THOMPSON,
President, Roosevelt Memorial Ass'n.,
1 Madison Ave., New York City.

The Railroad Station of the Future

"That the railroad station of the future may be either entirely a garage or that it will contain a space set aside for motor truck trains," was a statement made by W. E. Symons, railroad expert, at a meeting of the New York Railroad Club

Discussing the suggestion that the time was at hand when the railroads should seriously consider the policy of short line feeders for motor truck transportation, where the former has been conducted at a loss in the past, Mr Symons said:

"It is well known that on branch lines, particularly at the extreme end of the branch line, the railroad company is usually required to spend a great deal of money for a passenger station, freight depot, roundhouse, yards, turn-table, water tank and other terminal facilities expenses which as a rule are far in excess of what the volume of business would warrant. Local pride prompts the citizens to request or demand that the buildings be of a character that will conform to the general style of architecture in the town, and, as a rule, they are much larger than should be required for the volume of business handled.

"By the use of motor trucks the terminal facilities would consist practically of what might be called a garage for the motor trucks with a very limited amount of labor employed. This would consist of a mechanic or two. The depot facilities could be very limited as it could be easily arranged within a reasonable radius of the center of the town to deliver passengers carried to their homes, possibly providing a slight extra charge where their residence or point of delivery was considerable distance from the station

"This would also be true with respect to freight which could be on the basis of warehouse door delivery which would materially reduce the expenses on the part of the transportation company and give the patrons much better service."

"The Ace of Clubs"

If you have had your vacation forget it. If you haven't—forget it till you get it. Vacation *daze* should end when office days begin

Mountain trails may lead your vacation to the heights of pleasure but they won't take your vocation to the heights of success. Forget every trail but the sales path and hit it hard!

Angling for trout is at best a recreation. Angling for business is a continual re-creation of opportunity. Food for thought is the greatest bait in the world.

Getting trout on the dangled line is satisfactory only to the angler. Getting customers on the dotted line should prove a source of satisfaction to all concerned

Come out of the woods. There is bigger game on the hills of competition than in all the mountains of North America. There is more to be caught in the channels of business than in all the streams of the world. If you fail to land your share don't blame the stream.

Like the ancient fox, the quitter generally remarks: "They are poor fish, anyway." In most cases he is the poor fish!

Whatever you go after, bag the limit! The only license you need is a certificate of determination. Life memberships are always available. The only equipment you need is a double-barrel shot of enthusiasm. If you are without these requisites you may have trouble in the woods.

Remember Red Riding Hood She had an awful battle in the grove. And there are a lot of wolves left yet. If the poor little dame in the scarlet duds had been properly equipped she would have never lost her basket full of sweet cookies. It was the old, old story of unpreparedness. And the wolves in business today are just as keen for a free lunch as the one that annoyed Mlle. Hood.

Carry your basket full of business in one hand and a good big club in the other. Preparedness (meaning confidence multiplied by quitless energy) is the Ace of Clubs!—Taken from "The Punch," Maxwell-Chalmers House Organ.

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Relations of Highways to Living Costs

Legislative forces are again on the trail of Old High Cost of Living. These forces are in full swing, with a Senate sub-committee taking the lead at the National capital.

So far, Old High Cost has had his usual luck in keeping more than a tail's length ahead. His pursuers have been unable to "get anything on him," that is, anything they can tie to.

This last chase started a few days ago, when government employes decided they had reached the limit of endurance in trying to keep up with ascending food costs. Their appeals for economic relief reached Congress with the result that the hunt for the old villian was on again, and the entire country soon joined in the chase. Already the pursuers are striking the usual conflicting and diverging trails. One scent leads to the packers, another to the butter and egg trust, another to this, another to that.

In all of the hearings and discussions, both in public and private, earnest seekers after the fundamental reasons which underlie the present causes of unrest, find themselves coming out on the same old trail, the unimproved road. It is the profiteer's safe ambush, protecting as it does a long line of cormorants in the form of unnecessary middlemen who are aided in their nefarious work by the unreliable routes to market.

Whatever the remedy proposed, there is always the matter of transportation. Regardless of how many marketing agencies may be brought into operation, or how many restrictions may be thrown around the middleman, no permanent solution can be reached until the road between the producer and consumer is shortened by types of construction that will insure a speedy and open thoroughfare to market under all weather conditions. These are facts that are becoming more deeply impressed upon the legislative mind as high cost investigations proceed.

It is admitted that road building has been given a tremendous boost during the past few years. But even with construction under way practically in every State, such construction is largely in patches, and the process of working out from the neighborhood road to a comprehensive system must necessarily be slow, too slow in fact to meet the economic demands of the hour which are now being so sharply expressed in the cry for lower prices.

Far-sighted members of Congress have had in mind the need for a still greater development of public roads, with the result that a bill for a national highway system is now pending in the United States Senate, introduced by Senator Townsend, chairman of the committee on post offices and post roads. It is proposed in this measure to create a nation-wide system of highways under federal control and maintenance embracing not less than two per cent. nor more than five per cent. of the mileage in actual use in each State. The location of the federal lines is to be determined by a Federal Highway Commission, after advising with the various State highway departments.

The national system is planned to provide an outlet or a logical and economical connection with the various State highway systems, the latter in turn to be co-ordinated with county systems. Thus, it is proposed to permanently solve the highway transportation problem in its relation to living costs by providing once and for all a complete system of logically connected and well built highways in order to finally remove the profiteer's chances for covering up his nefarious practices in price juggling on food products, as he is now able to do, owing to inadequate lines of delivery from the producer to the consumer.

Advocates of a national highway system are presenting with much force the fact that stabilized living costs will come only with the construction of modern roads upon a co-ordinated county, State and national basis, and that this much desired aim can be achieved best by the government beginning at once on the long lines, while the States build the short lines.

Should Not Prohibit Trailer Trains

Legislation prohibiting the use of trailers or the use of more than one trailer with a motor vehicle is asserted by trailer manufacturers and users to be wholly unnecessary and directly opposed to the best interests of the general public. The more trailers that can be drawn by a motor truck or tractor, the lower is the cost per ton of haulage. While trains of three or four trailers should be excluded from the most congested streets and sections of large cities, they should not, for this reason, be prohibited throughout a State.

Trains of five to ten slow-speed trailers are much used with tractors and traction engines for road construction work and for hauling ore in the mining regions, timber in the lumber sections, and grain in the wheat and corn belts. They travel at not more than five to six miles an hour and are used where roads have not been improved or are under construction and there is very little or no other traffic. Their operation should not be prevented by unwise legislation and registration fees should be less, on account of their slower speed, than for trailers used in general haulage.

Linking the Truck to the Railway

As a result of a referendum among its members the Chamber of Commerce of the United States published on August 10th, its recommendations as to railway legislation and control. Corporate ownership and operation with a prompt return of the roads to their owners was of course demanded. Other recommendations look toward consolidation in strong competing systems, a Federal regulation of capital issues and expenditures, regulation of intrastate rates and ratemaking by the Interstate Commerce Commission.

A significant and gratifying feature of the Chamber's recommendations is the proposal to create a Federal Transportation Board, whose general duty it shall be to promote the development of a national system of rail, water and highway transportation. Such a system would make it possible to articulate and economically use all kinds of transportation facilities, including tracks, terminals and transfer facilities, of steam and electric roads, waterways and hard-surfaced highways.

Through this recommendation the National Chamber of Commerce has shown its characteristic broad-mindedness, in that it recognizes as important factors in the transportation problem not only the railway train but the boat, the electric car and the motor truck. Should this program be carried out, the field of the commercial motor vehicle will be considerably broadened, and it will take its place in a chain of national transportation systems as an indispensable and possibly the most important factor.

Making the Truck Boost Business

The advantages of the motortruck and its possibilities as a profit-maker are not limited by any means to its power as a carrier. More than one aggressive merchant has discovered in his motortruck one of the strongest pulling and widest reaching advertising mediums that could be procured.

It therefore is worth thinking about when the purchaser of a motortruck is ordering a body for it, whether he cannot combine its carrying value with a strong advertising message. There are two ways of "putting over" such a message—either through the specially designed body which will attract attention to the business of the user, or through the type of signature and decoration on the regulation body used for the truck.

The Philadelphia "Ledger," referring to some special body jobs familiar to those who go about the streets of Philadelphia, says that one of the cleverest truck bodies and the most profitable, as well as a pioneer in that field, was a gigantic shoe with doors through which the load could be passed. The shoe dealer who used this as the body of his delivery truck was situated several blocks from the center of the city, but promptly began to receive phone calls, as well as many visits from people in all parts of the city who had seen his shoe message and remembered the names printed boldly on it in colored letters.

While this type of body is, however, more especially practicable for use on the smaller type of trucks, whereas greater carrying capacity is an essential in the larger models, in several instances dairy companies, lumber mills and similar businesses have obtained big advertising value through decorative treatment of their truck bodies.

One dairy company which had artists paint pasture scenes in cool green upon the white enameled sides of their trucks won a general goodwill through this attractive suggestion as to pure, rich quality of its product.

Even if the advertising is merely in the form of a painted sign naming the business, the value of such a sign, moving to catch the eyes of the public, and passing before thousands of persons every day it is in service, can hardly be estimated. Men who pay big money for stationary signs and yet fail to use the commercial vehicle as an advertising medium, are missing an excellent opportunity.

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The Truscon Laboratories
where Laboratory Quality
Finishes are Manufactured

"Laboratory Quality"

And What It Means To Buyers of

WOOD and METAL PRIMERS	GEAR FILLERS
COLOR VARNISHES	ROUGH STUFF
CLEAR FINISHING VARNISHES	JAPAN COLORS

Laboratory Quality is the Buyers' guarantee. It insures products that embody only the highest possible quality and uniformity. Nothing is left to chance or guess work. Every ingredient and process used is the result of scientific study.

Laboratory Quality is the standard of every product which The Truscon Laboratories offer to vehicle manufacturers and which includes a complete line of finishing materials.

The extensive plant and facilities of The Truscon Laboratories assures *Laboratory Quality* on quantity production. It insures an adequate supply upon which vehicle manufacturers may depend at all times.

Laboratory
THE TRUSCON LABORATORIES
Quality

The Truscon Laboratories

Manufacturers of
Automobile Colors, Undercoatings, Enamels, Color Varnishes, Baking Japans and Varnish

Detroit - Michigan

Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

VIII.—GEAR BOX WORK

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

Because of its ability to function with more or less satisfaction under service abuse, the gear box of a modern car rarely receives the attention it merits. Gears are operated with too little or improper lubrication; with loose bearings and with "dubbed" or partially stripped gears. The motor car mechanic should know how gear box trouble can be reduced; and when it has occurred, how it can be remedied.

General Gear Box Care

The kind of lubrication used in any gear box depends upon the construction. But a heavy grease should not be used. In general, gear boxes having ball or roller bearings should use a lighter lubricant.

The grade of lubricant used should be that recommended by the car maker. If the gears are noisy, the use of sawdust, ground cork, etc., mixed with the grease to give quiet operation, is to be discouraged.

In general, a lighter grade of lubricant should be used in winter than in summer—that is, the regular lubricant should be thinned out slightly. Not only does the cold lubricant loose certain lubricating power, but also an excess amount of power is required in churning the hardened lubricant. Incidentally, when starting a car on a cold morning, it will be much easier on the storage battery if the clutch be pushed out (refers only to cars having a sliding gear transmission and motor starter direct-connected to the engine).

Gear Box Troubles

Among the gear box troubles are the following:

1. Failure of gears to stay in some particular speed. This is usually due to wearing or breakage in the shift lock (see Fig. 2). It may be due to worn gear or clutch teeth; or to mis-alignment of the shafts.

2. Clashing of gears on shifting. Commonly due to a dragging clutch, but may be due to worn or broken gear teeth.

3. Whining or grinding of gears may be due to lack of lubricant, loose bearings, or worn or broken gear teeth.

4. Lubricant leakage may be due to too much lubricant in the gear box, but more commonly to worn bearings and packings.

Gear Box Repair

In Figs. 1 and 2 are shown sectional views of a standard gear box. It is to be noted that this particular box, as well as many others, can be dismantled without removal of the housing from the car. For ordinary inspection and repair this method is satisfactory, but where fitting of new parts, adjustments, etc., are necessary, it is found more efficient to remove the entire housing from the car and overhaul it on a special bench.

Such a bench is shown in Fig 4. Where only occasional gear box jobs are handled, it is inadvisable to construct such a stand. But in the larger shops and service stations it will be found to be well worth the trouble taken in constructing it.

The gear box is supported on angle irons in the same manner as it originally was on the sub-frame of the car (in case of separate gear box systems). In the case of unit power plant gear boxes, a special fitting is required for each type of box. This stand may also be used for rear axle gear boxes and differential work; and if desired and as is sometimes done, gear boxes may be "run in" from an overhead shaft on the stand.

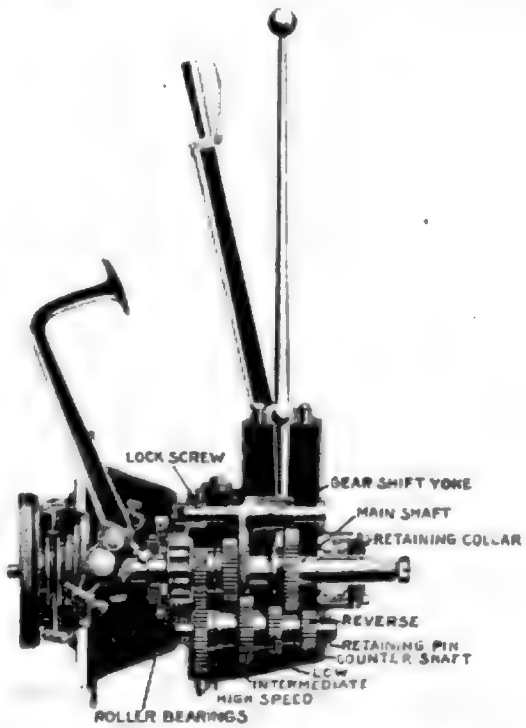


Fig. 1. Photographic sectional view of a standard gear box, showing the relation of the various parts.

Tearing Down the Gear Box

The following method of tearing down the gear box illustrated in Figs. 1 and 2 applies in general to all gear boxes. To tear down the gear box:

1. Disconnect the drive shaft coupling or universal from the rear of the gear box.

2. Remove emergency brake linkage connected to emergency brake lever.

3. Drain gear box.

4. Remove the gear box housing cover and shift lever after removing the bolts holding it in place.

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5. Remove the set screws holding the gear shifter shaft in position. Draw out the gear shifter shaft and pick out the shifter.

6. With a steel rod, as shown in Fig. 3, pry on the gears and shafts one by one to determine whether side or end play is present. Note presence of either for future work.

7. Remove cover holding rear bearing in position.

8. Remove the rear bearing (a special puller may be necessary for this).

9. Draw the main gear shaft out to the rear, leaving the intermediate and low speed gears free to be picked out.

10. Pick out the front internal bearing and thrust washer.

11. Pull the retaining pins in the countershaft, and draw the countershaft out to the rear.

12. This will free the remainder of the parts, permitting them to be removed and examined.

If the gear box is of the unit power plant types, it may be completely removed from the car by freeing all retaining lever leakage, etc., and removing it together with the bell housing. However, as stated, unless new parts are to be fitted, such removal is usually unnecessary.

The parts should all be thoroughly cleaned in kerosene. In the case of ball or roller bearings particular care should be taken to wash the grease and dirt *out*, not in. A hot solution of caustic potash and soda will be found very effective in cleaning bearings prior to inspection and replacement and the same applies to gears. This solution comprises a cup of potash to a pail of boiling water. After cleaning, the parts should be immediately washed in clean kerosene.

If the bearings are of the Hyatt roller type, providing the bearing cage is rigid and all parts of the bearings look good, the bearing may be replaced. But if any looseness in the bearing causes noisy gears, a new bearing should be installed. If the cage of the bearing is "racked" and loose, a new bearing is advisable.

A similar adjustment should be made if ball or roller bearings are used. Any irregularity in the face of the balls, rollers or races, render it advisable to replace the entire assembly. Some bearings coming under the above classification can be adjusted, and if so, adjustments should be made bearing the following points in mind: Ball or roller bearings must not be too tight, so as to bind nor too loose, so as to pound. They must be set so that a barely perceptible "shuck" is present after all adjustments have been made, and the locknuts tightened.

After the bearings, the gear teeth should be examined. These should be smooth, and show little signs of wear. If wear is appar-

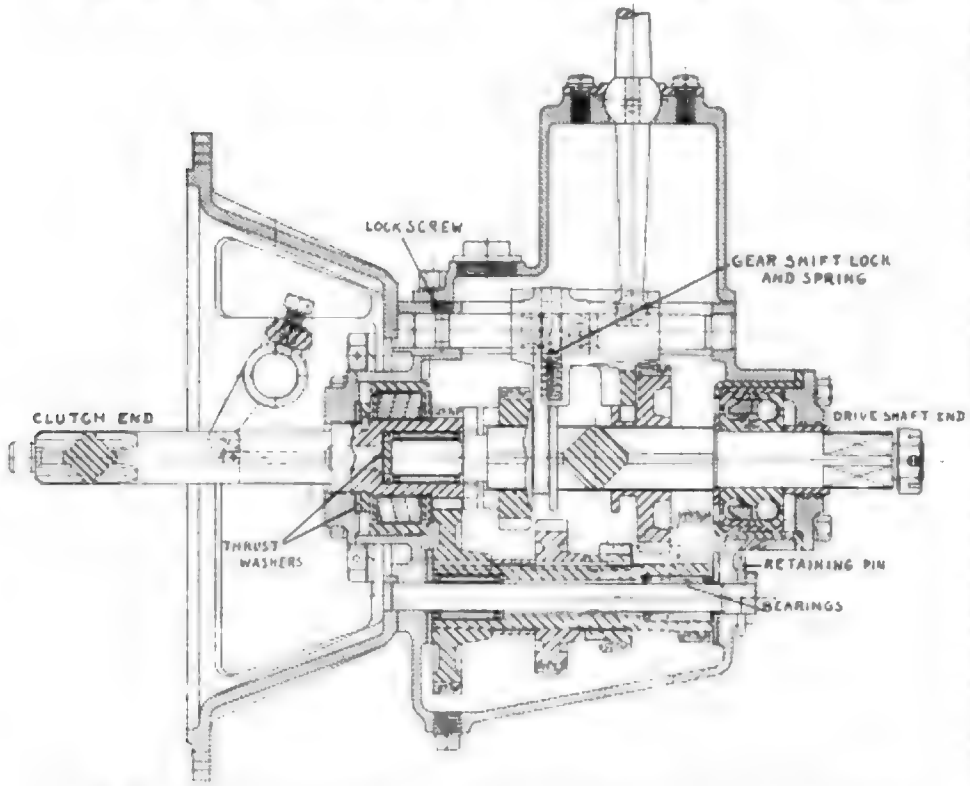


Fig. 2. This shows how the different parts are fastened together, and indicates the parts requiring attention.

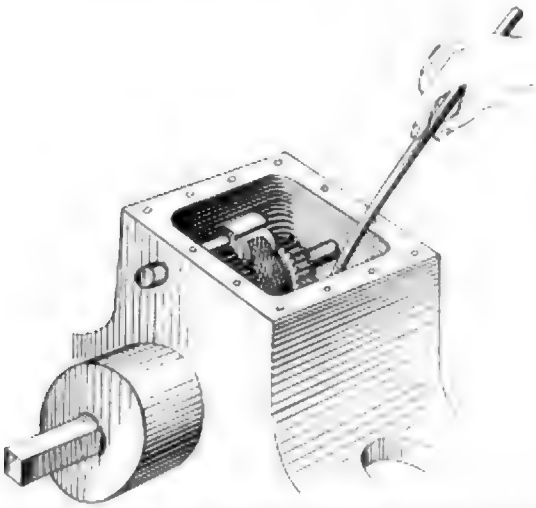


Fig. 3. Looseness in any of the moving parts can be detected by prying on them with a steel rod. Both endplay and sideplay are possible.

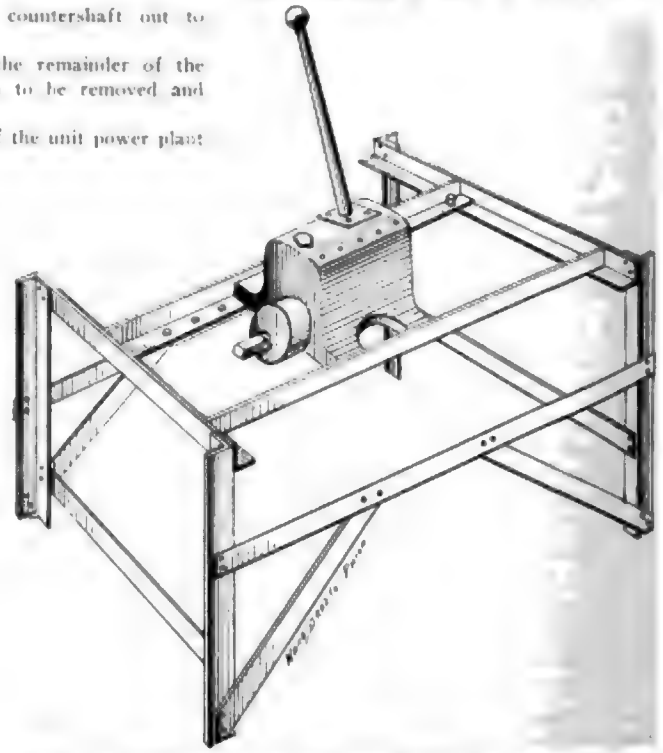


Fig. 4. An adjustable gear box repair stand facilitates the work. This stand can also be used for rear axle and drive shaft work.

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ent it is better to install new gears, though the life of worn gears is often great, noisy operation and uncertainty render their use inadvisable.

If the trouble in the gear box has been evidenced by a continuous sound, increasing and decreasing in intensity, it would be advisable to test the gears and shafts to see if they are "true".

The shafts can be caught in a lathe and centered, and their truth determined, and afterwards the gears can be slipped in place and gauged.

The gear shift locks and ease of sliding the movable gears should be examined and tested, and any indicated repairs effected. The gears should slide freely on the main shaft and the spring on the gear shift lock should be "live."

The order of replacement of parts is the reverse of the tearing down. Care must be taken in placing the gears in position, and in fitting thrust washers, etc., to remove excessive end play. Lubricant should be replaced and the gear given a short "working in" run before connecting up the drive shaft for actual service.

How Conditions Affect Motor Truck Design

By LEWIS J. KALB

Assistant Supervisor of Engineering, the Standard Parts Co., Cleveland, Ohio. From a paper read before the Society of Automotive Engineers, Summer meeting, 1919

Performance of automotive vehicles is properly measured by their comparative ability to perform the function for which they are intended. It is logical then that passenger car performance be measured in terms of speed and acceleration. In the case of motor trucks, however, these are not the most important considerations, it being almost universal practice to limit the speed by a governor, which in itself minimizes the importance of acceleration. Furthermore, wind resistance is negligible at present day truck speeds, so that practically the only resistances to be overcome by a motor truck are road friction and the force of gravity. The performance of motor trucks can therefore be measured simply by their ability to overcome these two forms of resistance.

Now, both road and grade resistance are in direct proportion to the weight carried and can be expressed in unit terms such as pounds per pound and pounds per ton of total load. If the tractive force which the driving wheels of a truck are capable of exerting be expressed in the same terms, it then becomes a simple matter to compare the resistance to be overcome with the force available for doing it. The unit tractive force is therefore the best index of the ability of a motor truck.

Ability Not Affected by Location of Driving Wheels

It might be well to call attention to the incorrectness of the idea held by some that a truck's ability is affected by the location of the driving wheels and the distribution of the load. The fact is that it makes no difference whether the drive be through the front, the rear, or all four wheels, or whether the load be carried on the truck or on the trailer; the total resistance and consequently the force required to overcome it will be the same. There are in more or less general use a number of ability formulas of indisputable merit, and in addition to these, many engineers have their own pet ways of expressing ability which serve their own purposes.

To determine in advance just what the ability of a truck should be would appear a rather difficult task. In general, it can be said that high-gear ability should be sufficient to overcome average road resistance with a sufficient surplus to climb the grades that are encountered with such frequency that gear shifting would be objectionable. The low-gear ability should be sufficient to overcome practically the worst conditions of grade and road. A study of the abilities of existing trucks shows that practice varies widely upon this point. In the smaller sizes, ranging from 1,000 to 2,000 pounds capacity, there seems to be a tendency toward passenger car ability. This seems quite logical, for most of these trucks run on pneumatic tires and at speeds which call for that ability necessary for acceleration and overcoming wind resistance.

In determining the proper ability coefficient to use in new designs, it would be unwise to follow present practice blindly. There are a number of causes which tend to make the average engineer lean toward excessive ability. The fact that it is so difficult to determine just what proper ability is, leads the engineer toward unnecessarily high ability just for the sake of being on the safe side. Until recently the great majority of trucks on the market had three-speed transmissions with rather limited low-gear reductions. Undoubtedly excessive high-gear abilities were necessary in many cases to have anything like adequate ability on low gear. Furthermore, the great majority of truck buyers judge a truck merely by its power, forgetting entirely the effect that excessive ability has upon economy.

High Ability Costs Money

Engineers must of course design what the public wants or thinks it wants. An effort should be made, however, to educate users on this point and bring them to understand that high ability costs money. Some consistent propaganda along this line would undoubtedly cause truck users to modify their demands appreciably.

The roads in this country are being consistently improved and do not require the abilities that were needed five years ago. Of course, the use of trucks in country districts is increasing, but it is hardly right to penalize the great majority of trucks which are operated on improved roads for the sake of the few that operate in rural districts over unimproved roads.

The fuel problem is one which is becoming more serious daily, and the constantly increasing number of trucks in service is certainly not tending to alleviate the situation. If this growth is to continue unhampered something must be done both to improve truck economy as well as to enable trucks to operate upon the poorer grades of fuel which are now available. I know of no better way for accomplishing these two objects than a reduction of high-gear abilities. Not only will fuel consumption be lessened by reducing the piston displacement per ton-mile, but by reducing the power factor of the engine it will be possible to operate satisfactorily on much heavier fuels. The truth of this statement is shown by the fact that marine engines, whose power factors are much lower than those of passenger cars or trucks, operate satisfactorily on kerosene. This has never been successfully done with either trucks or passenger cars.

High-Gear Ability Should Be Kept Down to Minimum

The ideal design of a truck is one which combines maximum economy with adequate ability. Now, since trucks operate at least 90 per cent. of the time on high gear, the interests of economy will be served if we keep high-gear ability down to the minimum. In my opinion, the ability coefficient in high gear should be about 0.003 to 0.006 lb. per ton. As stated previously, the low-gear ability of a truck should be sufficient to overcome the worst conditions of road and grade. This is a requirement which it is impossible to fulfill entirely. The best that can be done is to utilize all of the ability that the adhesion of the driving tires will permit. This can be done by making the low-gear ratio sufficient to almost slip the wheels under full engine torque.

Such a low-gear reduction as this would, of course, require a four-speed transmission. About the maximum ratio obtainable with a three-speed transmission is four to one and anything greater than this would cause very unsatisfactory gear changing. Four-speed transmissions have in the past been the exception, and even those which did exist did not have anything approaching the proper low-gear ratio. In fact, the idea of utilizing all of the available traction on low gear seems to have become popular in the past few years. At present there is a decided trend in this direction which we can expect to grow very rapidly when engineers and truck users have had time to realize the possibilities.

(Continued on page 30)

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"Vehicle Monthly" Time Savers

"The Vehicle Monthly" will appreciate the receipt of any "Time Saver" made by its readers. A rough sketch and a short description are all that is necessary.

(This series of "Time Savers" was begun in February, 1919. Back numbers may be had from the publishers)

"Vehicle Monthly" Time Saver No. 36
HUB CAP WRENCH

A handy wrench that is almost universal for removing hub caps is illustrated. A heavy leather strap is bolted to an ash or hickory handle, and carried around a loop, fastening in a buckle also bolted to the handle. The end of the handle is beveled, so that after the strap is taken up to the hub cap, by swinging the handle the resulting wedging action tightens the strap on the cap, permitting it to be turned. By turning the device over, the direction of motion can be reversed.

"Vehicle Monthly" Time Saver No. 37
PISTON GUIDE CLAMP

It is not always an easy matter to replace piston and connecting rod assemblies, due to the fact that the rings expand and bind on the edges of the cylinder. Particularly is this true in the case of V-type engines where the assemblies are inserted from the crankcase. By the use of a piston guide clamp as shown, the piston may be readily inserted. This clamp is a sheet metal cylinder slightly bell-mouthed, and split, having lips and screw permitting it to be tightened on the piston. By this the rings are held in a compressed position until they slide into the cylinder.

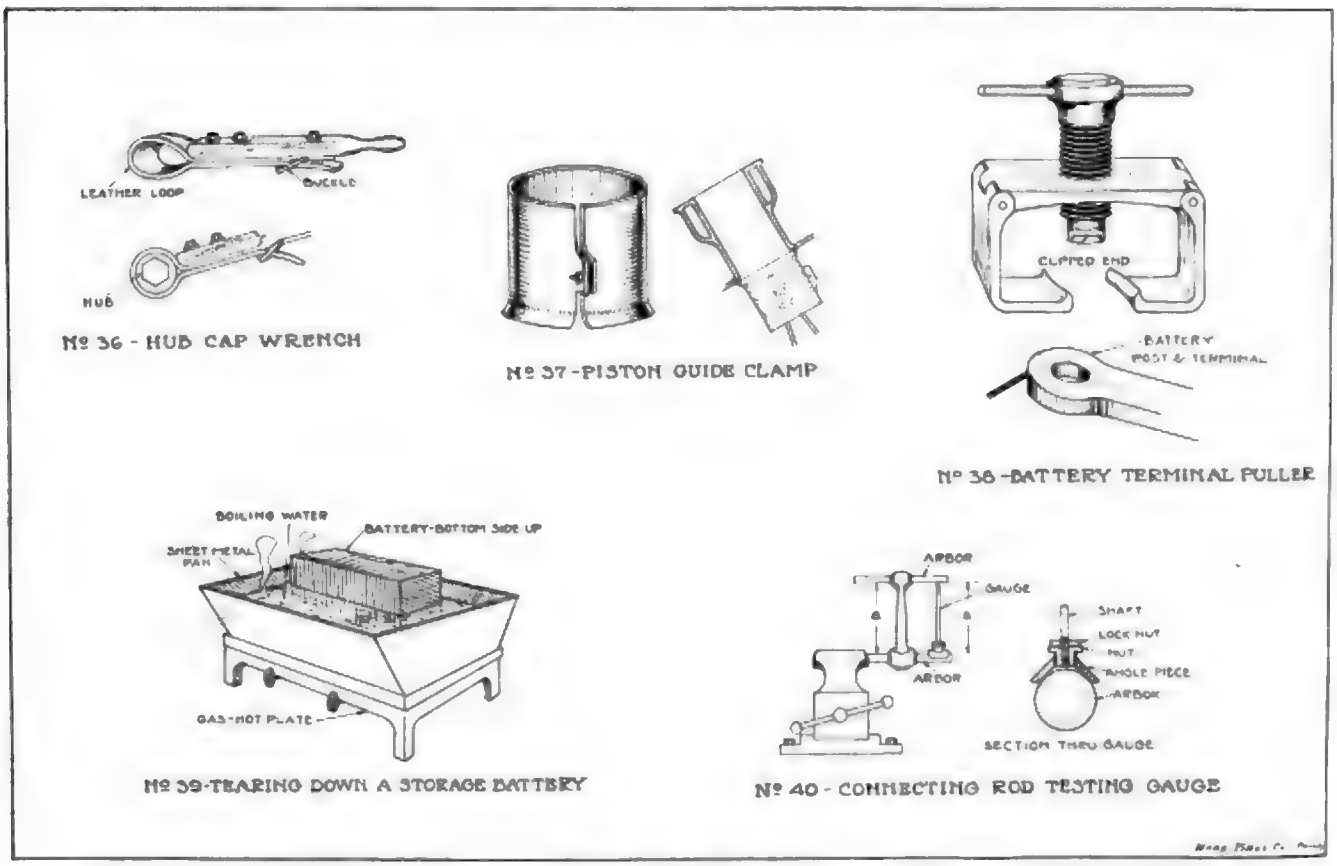
"Vehicle Monthly" Time Saver No. 38
BATTERY TERMINAL PULLER

The common method of removing battery terminals in tearing down prior to overhaul is to drill away the posts until the terminals can be pried off. And when so removed, the drilled away material must again be replaced by "burning in" on assembly. However, a simple terminal puller permits the terminals to be removed without drilling. It is similar to the ordinary gear puller, having jaws that fit under and engage the terminal at each side of the post, and a threaded arbor having a cupped end that is pressed against the post. By this device the terminal is quickly broken away from the post without loss of material.

"Vehicle Monthly" Time Saver No. 39
TEARING DOWN A STORAGE BATTERY

Formerly storage batteries were torn down by means of hot putty knives, and gas burners, but this was found to be a slow and not especially clean job. A better method is to use steam, or hot water. A simple method comprises immersing the battery top downward in boiling water, after first having drained the cells and removed the terminals. After a moment's immersion the battery is removed, given a shake, causing the cover to fall off and the plates to drop out. The ap-

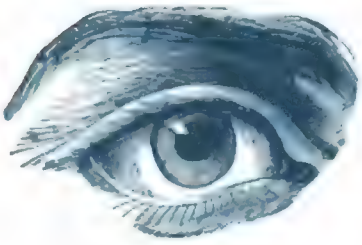
(Continued on page 19)



"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ON THIS PAGE.

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Rowe
THE PIONEER WORM-DRIVE TRUCK

Have An Eye  to the Future

which means, Mr. Dealer, you should tie up with a truck that will secure the good will of every customer, for, in this way only, can a permanent business be established.

Because the ***Rowe Runs Right***—on the level and up hills; because it is backed by an organization with the capital and facilities to give prompt and efficient service; because it sells at a fair figure, allowing a good margin of profit for the dealer; because ***it makes friends everywhere—and keeps them***—for these reasons you should give consideration to an agency for the Rowe Truck.

See next three pages

ROWE MOTOR COMPANY
LANCASTER, PA.

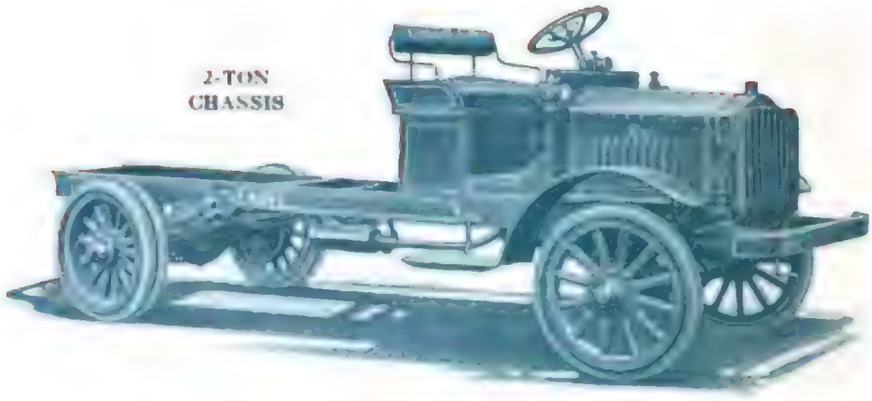
ROWE RUNS RIGHT ROWE RUNS RIGHT

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Rowe

Rowe

2-TON
CHASSIS



ROWE trucks have specially designed frames and units of national reputation. Among the latter are:

Sheldon Springs and Axles, Ross Steering Gear, Bosch Magneto, Zenith Carburetor, Wisconsin Engine on all models except 3-Ton Pneumatic High Speed Chassis, this having 50 H. P. Herschell Spillman Engine.

Complete description in catalog. Write for a copy, also interesting proposition to dealers

2½-TON
CHASSIS



ROWE MOTOR COMPANY

LANCASTER, PA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

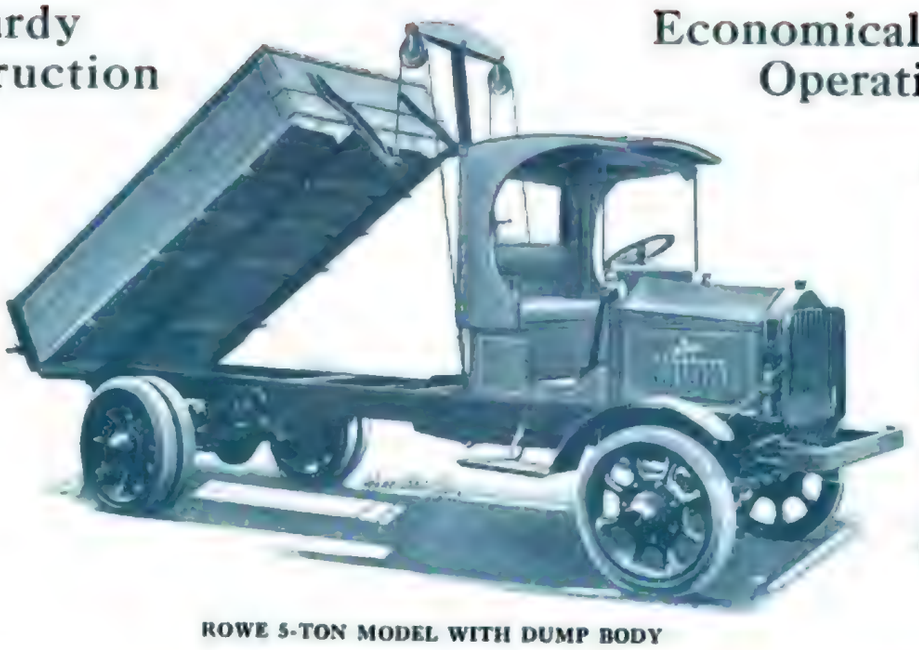
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Rowe

Rowe

Sturdy Construction

Economical Operation



ROWE 5-TON MODEL WITH DUMP BODY

Accessibility of all parts is one of the particular features that recommend Rowe Trucks to careful buyers.

Repairs and adjustments are very infrequently required, but when exceptional service makes them necessary, they may be accomplished more quickly, more easily and at less expense.



REAR VIEW ROWE 5-TON MODEL FITTED WITH STAKE BODY

ROWE MOTOR COMPANY

LANCASTER, PA.

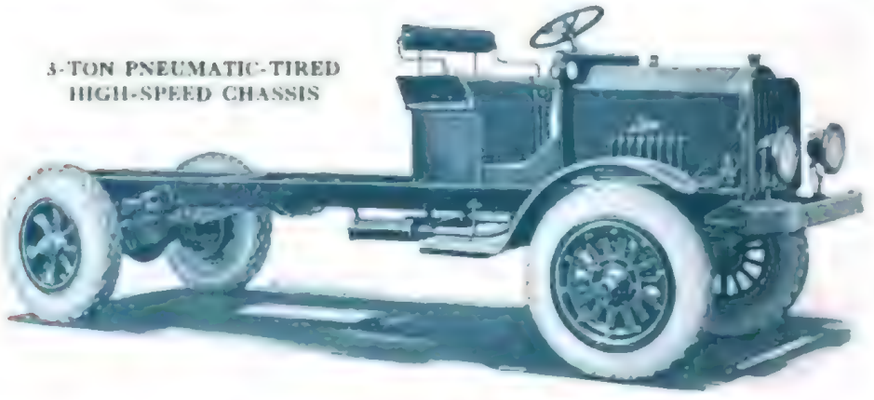
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Rowe
THE PIONEER WORM-DRIVE TRUCK

Also Pioneer of Pneumatic-Tired Trucks Designed Expressly for Commercial Use



3-TON PNEUMATIC-TIRED HIGH-SPEED CHASSIS

This type of Rowe Truck is proving a splendid sales-getter for dealers.

It is especially recommended for inter-city freight service, for suburban delivery routes, for movers and packers, etc.

Travels 30 miles an hour without the least injury to engine or any other part of truck, and the driver finds it as comfortable in riding qualities as a railway coach.

Send for complete specifications and catalog of the entire Rowe line. See illustrations on the preceding two pages.

Remember that Every Rowe Truck is Guaranteed
Splendid dealers territory may still be had

ROWE MOTOR COMPANY
LANCASTER, PA.

ROWE RUNS RIGHT ROWE RUNS RIGHT

"Vehicle Monthly" Times Savers

(Continued from page 14)

paratus required for this work is shown, comprising simply a shallow metal pan partially filled with water and heated from a gas plate

"Vehicle Monthly" Time Saver No. 40
CONNECTING ROD TESTING GAUGE

Wrist pin bearings and crank shaft bearings should be parallel so that the pistons will be in alignment with the cylinders. Otherwise unnecessary friction and wear will result On overhauling engines this alignment should be checked. This may be done by means of two arbors and a gauge. One arbor fits the crank shaft bearing (after it has been scraped and fitted to the crank shaft) and the other wrist pin bearing. Each extend at least 4 inches both sides of the bearings. The gauge is a piece of angle iron having a nut fastened to it, and carrying a piece of drill rod. This drill rod length is approximately the distance between the arbors and may be correctly adjusted and locked through the threads and locknut. By gauging first one end of the arbors, and then the other, and making the distances the same, the bearings can be tested for parallelism. Sighting between the rods determines whether they are both in the same plane. A heavy wrench can be used to bend them.

The Basing Point for Steel

The vexed question of a single or plural basing point for steel products was taken up July 26th, by the Federal Trade Commission when it received the carefully prepared complaint of the Western Association of Rolled Steel Consumers. The nominal respondent is The United States Steel Corporation, but every maker and user of steel products is interested in the outcome.

The Federal Trade Commission was urged by both the parties of record to take jurisdiction, as the basing point for steel prices had been a bogey in the trade for years Judge E. H. Gary, of the Steel Corporation, has said that this action is "the biggest lawsuit ever tried in this country."

Upon receipt of the complaint the Commission addressed the following letter to President Gary, of the Steel Corporation, and to the United States Chamber of Commerce:

"An application has been received from the Western Association of Rolled Steel Consumers for the issuance of a complaint by the Federal Trade Commission against the United States Steel Corporation and others, which alleges that the practice of selling rolled steel on a Pittsburgh basing point basis is repugnant to the Federal Trade Commission Act and to the Clayton Act.

"A copy of this application is enclosed herewith.

"The Commission is advising you of this matter in order that you may inform members of your organization so that each may determine if he is interested therein

"Additional copies of the application will be sent on request to such members of your organization or other parties as may request it.

"It is suggested that you also advise them directly of this matter in order that each may prepare written statements of his position with regard thereto for submission to this Commission Such statements should be submitted to the Commission before September 1, 1919.

"The subsequent procedure in this matter will be as follows: After due opportunity has been given for all interested parties to submit statements to the Commission regarding their positions, and other information deemed necessary by the Commission has been obtained, public hearings will be held by the Commission, which interested parties are invited to attend, in order to determine whether the application should be granted, or other action taken according to the facts so developed.

"The question raised by the applicant may not be the only question involved in this matter and the remedy suggested by the applicant, namely, to make Chicago a basing point, may not be the only remedy, or the appropriate remedy, even in the event that the applicant's contention is found to be valid. In other words, the whole question of the practice of having basing points for making rolled steel prices may be involved, as well as the question whether Pittsburgh, or some other place should be the sole basing point, or whether there should be more than one basing point.

"Will you, then, aid the Commission's effort to bring notice to all interested parties, by informing your members as above suggested.

"By direction of the Commission.

"Very truly yours,

"VICTOR MURDOCK,

"Acting Chairman.

"Elbert H. Gary, Esq.,
"President, American Iron & Steel Institute,
"30 Church Street, New York City."

The Board of Trade of Superior, Wisconsin, has raised the same question with the Federal Trade Commission and several other complaints have been received The Chamber of Commerce of Birmingham, Alabama, has notified the Commission that it desires to be heard. All these complaints will be consolidated into the single proceeding.

A copy of the letter of notification has been sent to many government departments, including the United States Shipping Board, the United States Railroad Administration, the Post Office Department, the Navy Department, the War Department, the Interstate Commerce Commission, and others. It will also go through the American Federation of Labor to all central labor unions throughout the country.

The application for complaint made by the Western Association of Rolled Steel Consumers says the membership comprises over seven hundred fabricators of steel, operating in Illinois, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Kansas, Missouri, Montana, Nebraska, Oklahoma, South Dakota, Texas, Utah, Washington, Wyoming, Colorado and California, all being tributary to what is known as the Chicago district; that the United States Steel Corporation mill at Gary produces steel at a cost substantially lower than at the Carnegie plant of the Steel Corporation at Pittsburgh or at other corporation plants in Pennsylvania; that over one-fifth of the rolled steel made in the United States is made by the respondent at Gary, Indiana.

The applicant submits that the normal, reasonable price for rolled steel should be measured by cost of production with addition of reasonable profit and without addition of a large and arbitrary increase which forms no part of the production cost and is over and above such reasonable profit. The applicant declares that despite the fact that steel is made more cheaply at Gary, the complainants are compelled to pay a set price plus a freight rate of $5.40 per ton as from Pittsburgh, although in fact the steel is not actually shipped from Pittsburgh at all.

Certain discriminations in price, especially to agricultural implement manufacturers are charged by the steel consumers and the whole is alleged to be so repugnant to the Federal Trade Commission law and the Clayton Law that it should be ordered discontinued.

The filing of the complaint of the steel consumers followed an informal hearing before the Commission at the request of Judge Gary and Judge John S. Miller, counsel for the rolled steel consumers.

In urging that the Commission go into the subject thoroughly, Judge Gary stated:

"The iron and steel industry in this country really started at Pittsburgh many years ago That was then probably the cheapest point of production, largely because the fuel was there, in immediate proximity, and the iron ore was brought on the lakes to Conneaut, north of Pittsburgh, and brought by a short railroad to the furnaces; and the limestones were in that vicinity It was the cheapest point for the assembling of the raw materials, and consequently the cheapest place for producing iron and steel.

"That being so, of course the iron and steel products which were manufactured were sold at a price f. o. b. works or f. o. b. mill, which meant f. o. b. Pittsburgh. Then, later, works were started at other places—Youngstown, not very far from there; Johnstown, in the other direction, not very far from Pittsburgh—and the manufactured products were sold then f. o. b. Pittsburgh."

During these years the custom of the Pittsburg basing point became so fixed in the steel industry that a change will cause far-reaching results. How serious these resulting changes and how serious the hardships, if any, caused by the present custom are the questions to be argued out before the Trade Commission.

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Ford Radiator Replacements

There is a great opportunity for any motor car repairman or body builder to offset some of the high cost of living by replacing worn-out Ford radiators. The Corcoran Mfg. Co., Cincinnati, have gathered statistics tending to show that it takes about 200 radiator replacements each year to keep 1,000 Ford cars running. This means considerable business



Peerless Radiator for 1917-1919 Ford Cars. Made by The Corcoran Mfg. Co., Cincinnati, Ohio.

in any community, because there is no city, town or village that does not possess its quota of Fords.

With the No. 10 Peerless radiator for 1909-1916 cars and the 1911 Peerless radiator for 1917-1919 cars, the Corcoran Mfg. Co. supplies the means for you to capture the greater portion of the Ford radiator business within your reach.

Peerless radiators have the honeycomb core, giving greatest possible area of cooling surface, with a large water capacity, reducing heating troubles to a minimum. All parts coming into contact with water are of durable brass. As the dimensions are the same as the regular Ford radiator quick and easy installation is assured. These radiators cost no more than others which lack some of the very important features of the Peerless.

The Corcoran Mfg. Co., besides the manufacture of radiators, makes a good line of automobile fenders, hoods and tool boxes. A few months ago the company outgrew its plant and moved into the building shown in the illustration, where they have ample room for the steadily increasing business which comes to them from all parts of the United States.



New Plant of The Corcoran Manufacturing Co., Cincinnati, Ohio.

Motor Truck Design

(Continued from page 13)

The Class B truck is, in a way, responsible for the rapid growth of the idea, although not for its inception, as it afforded engineers a large scale demonstration of the principle. Anyone who has seen the B truck negotiating roads and grades over which other very good trucks were unable to move could not but be impressed.

Increasing low-gear ability will, of course, require a proportionate increase in the size of torque-carrying members back of the transmission, such as propeller shafts and live axles. However, the design of such parts to meet these conditions is a very simple and exact proposition. Since the torque required for slipping the wheels is a definite proportion of the load upon the tires, the torque and load-carrying members of the axle can be proportioned accordingly. Since it is impossible to impress a torque upon the axle greater than the adhesion of the tires will transmit, it will be impossible with an axle so designed to over-stress the torque-carrying members no matter how large an engine or how low a gear ratio is used.

Propeller shaft brakes also cease to be a bugaboo, for tire adhesion limits braking torque just as much as it does propelling torque. The advantages of this should appeal to axle manufacturers. Even without increasing the strength of the torque-carrying members increased low-gear ability should tend to reduce rather than to increase the strain on these parts. With adequate low-gear ability it is no longer necessary to speed up the engine and drop in the clutch suddenly to get out of bad holes. Instead, an even, steady torque is applied, which does much less harm than the shock of a suddenly applied torque. I know of an instance where the breakage of live axles was actually eliminated in a fleet of trucks operating in a very severe service by increasing low-gear ability.

How High- and Low-Gear Ability Affect Loading

An objection has been raised to increased low-gear ability on the ground that it will tend to encourage overloading. My experience leads me to believe that the amount of overload that a driver will carry depends, not on the low-gear, but upon the high-gear ability. When a driver finds that overloading necessitates more frequent gear shifting and consequent loss of speeds, he will be quite likely to make sure that his truck is properly loaded thereafter. Decreasing high-gear and increasing low-gear ability should therefore tend to discourage overloading.

Another objection to increased low-gear ability is that it makes low-gear operation too slow. This objection is hardly a valid one, for unless the conditions demand the use of low gear, the truck can be operated on second speed, which is faster than the low gear of a three-speed transmission. In fact, if we consider the low gear as an ability reserve, the other three speeds will in each case be faster than the equivalent speeds of a three-speed transmission. A truck with a four-speed transmission will therefore have a higher average speed than one with only three rates.

The objection raised to reducing high-gear ability is that such a move would not meet with favor in the eyes of truck users. To judge the merits of this objection, let us compare the hill-climbing abilities of two trucks, one with a high-gear ability coefficient of 0.072 and a three-speed transmission with a low-gear reduction of 4 to 1 and the other with a high-gear ability coefficient of 0.063 and with a four-speed transmission having a low-gear reduction of 5.8 to 1. Assuming that the road resistance is 0.03 pounds per pound, the three-speed truck will be able to climb a grade of 4.2 per cent. on high gear. On low gear this truck will have an ability coefficient of 0.272 pounds per pound, and will be able to climb a grade of 24.2 per cent. The truck with the four-speed transmission will be able to climb a grade of 3.3 per cent. on high gear. On low gear this truck will have an ability coefficient of 0.345 pounds per pound, and will be able to climb grades of 31.5 per cent.

Now, where is there a driver who can distinguish between a 3 and a 4 per cent. grade? The difference between a 24 and 31 per cent. grade, however, is quite appreciable. There is not the slightest doubt in my mind that the average driver would consider the four-speed truck the more powerful as well as the speedier and more economical of the two. The maximum ability of a truck is that on low gear, and consequently the power of a truck will be judged more by its low-gear than by its high-gear ability for the same reason that the speed of a truck is judged from its maximum or high-gear speed.

Much of the opposition to use of trailers in cities is due to the operation of heavy steel-tired vehicles. Such trailers used in subway construction work in New York did many thousands of dollars damage to new granite block pavement, the impact of the steel tires breaking the blocks and crushing the surfaces. The city engineer stated, however, that no damage had ever been observed as a result of use of rubber-tired trailers.

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BODY DEPARTMENT

VEHISOTE :

Efficiency
General Satisfaction
Economy



This handsome body with Vehisote panels is mounted on a Packard chassis.
Built by G. A. Schnabel & Sons, Pittsburgh

VEHISOTE SIDE PANELS

Over 60,000 closed panel bodies with Vehisote side panels now in service, each speaking a good word for Vehisote.

Vehisote is not a substitute for wooden panels. It is a scientific and positive improvement over wood or any other material for the purpose.

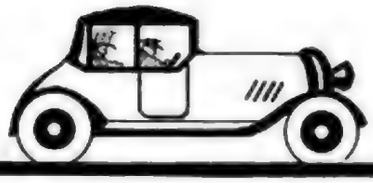
It is as far ahead of the old-fashioned methods as gasoline or electric trucks are ahead of the horse-drawn wagon.

THE PANTASOTE CO. 11 Broadway NEW YORK — Peoples Gas Bldg. CHICAGO — Penobscot Bldg. DETROIT

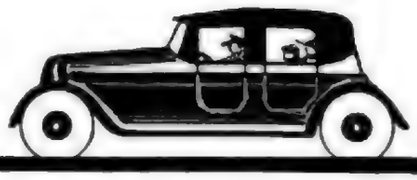
JOBBERS

The Scovel Iron Store Co., San Francisco, Cal.
Sligo Iron Store Co., St. Louis, Mo.
E. D. Kimball & Co., Chicago
E. C. Kadow & Co., Chicago
E. J. Coyle & Co., Chicago
C. H. Tiebout & Sons, Brooklyn, N. Y.
N. Langler & Sons, Brooklyn, N. Y.
H. D. Taylor & Co., Buffalo, N. Y.
W. E. Kleine & Co., New York City
H. Hett & Sons, New York City
W. T. Crane Cge. Hdwe. Co., Newark, N. J.
Gerhab & Ludlam, Philadelphia, Pa.
John C. Hills, Trenton, N. J.
Moesman-Yarnelle Co., Fort Wayne, Ind.
Wm. Stockhoff, Louisville, Ky.

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Closed Body HARDWARE



Window Regulators That Appeal to All Body Builders

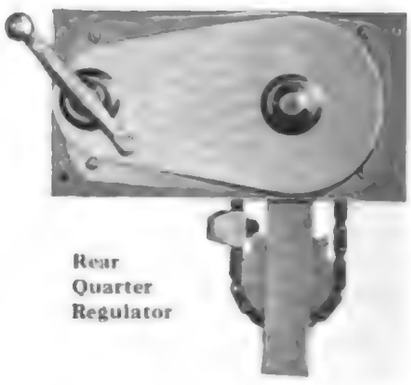
Very simple in construction and easy to install—just a matter of boring 6 holes and bolting to door.

A cone clutch insures regulator locking in any position in which the handle is stopped.

Should glass get broken, a new one can be installed without taking off the trimming. Merely place the regulator "on center" and the sash can easily be lifted out.

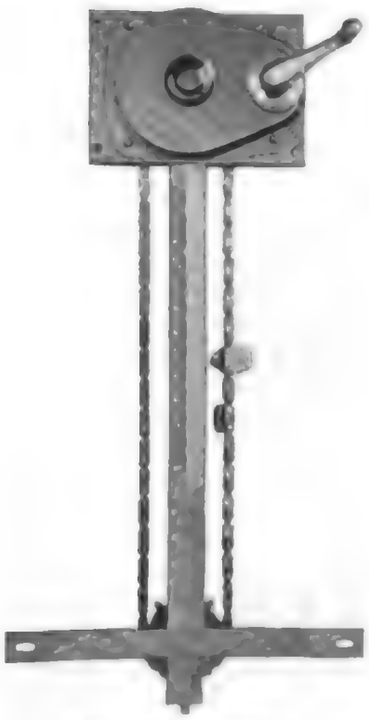
The regulators are made in any one-half inch measurements that customers desire.

We invite the trade to send for blue prints and samples.

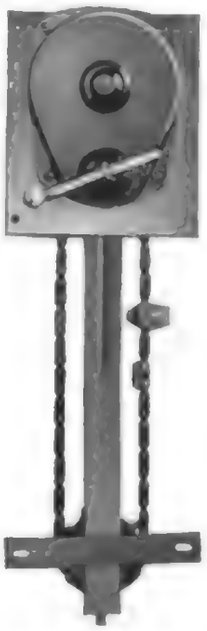


Rear Quarter Regulator

We also manufacture Curtain Rollers, Anti-Rattlers and Other Closed Body Hardware



Standard Regulator



Center Partition Regulator for Limousines



Off-Set Regulator

TERNSTEDT MANUFACTURING COMPANY

ARTILLERY AND MUSTER AVENUE :: :: DETROIT, U. S. A.

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Motor Bodies and Parts

Determining Moisture Content of Wood

The Forest Products Laboratory, Madison, Wis., gives the following directions for determining the moisture content of wood:

1. Select a representative sample or disc of the material.
2. Immediately after sawing, remove all loose splinters and weigh the sample.
3. Put sample in a drying oven at 212 degrees Fahrenheit (100 degrees Centigrade) and dry until constant weight is attained.
4. Re-weigh the sample to obtain the oven dry weight.
5. Express the loss in weight as a percentage of the dry weight, thus:

$$\text{Percentage moisture} = \left(\frac{\text{original weight} - \text{oven-dry weight}}{\text{oven-dry weight}} \right) 100$$

Short pieces of wood dry out much more rapidly than long ones. In order to reduce the time required for drying, therefore, the length of the sample in the direction of the grain should usually be about 1 inch, or not more than to give the sample a volume of from 2 to 24 cubic inches.

It is important that the weight be taken immediately after the sample is cut, for the material is subject to moisture changes on exposure to the air. The degree and rapidity of change are dependent on the moisture content of the piece and the air conditions to which it is exposed.

In order to insure good results, the weights should be correct to within at least one-half of one per cent.

When placed in the oven for drying, the samples should be open-piled to allow free access of air to each piece.

Setting Blood Albumin Glue in a Kiln

The high water resistant qualities of blood albumin glue would make it very valuable for gluing thicker stock than plywood when such stock is to be used under moist atmospheric conditions. An obstacle in the way of using this glue in ordinary joint work, however, is the fact that to coagulate and set it a temperature of 160 degrees F. or more is required. In the manufacture of plywood with blood glue, the joint is made in a hot plate press, but this method is not feasible for heavy stock.

Recent experiments at the Forest Products Laboratory, Madison, Wis., point to the possibility of setting blood glue satisfactorily in a kiln. Heavy blocks were glued up with blood glue in the usual manner and put under pressure with retaining clamps and I-beams. They were then placed in a kiln and subjected for several hours to a temperature of from 175 degrees to 200 degrees F. A relatively high humidity was maintained in order to prevent loss of moisture from the blocks and an accompanying decrease in the pressure.

When the glue was applied to cold wood, from 15 to 18 hours in the kiln were required to set the glue. When the wood was heated to 150 degrees F. before gluing, the length of time the stock had to be left in the kiln was much reduced. Two hours at a temperature of 200 degrees F. were found sufficient to set the glue in blocks 7/8 inches thick, consisting of 3 laminations.

Severe soaking and drying tests were afterwards given these blocks, and except for slight checking on the unprotected ends, the glue line remained intact. The shearing strength (on black walnut blocks) previous to the soaking test averaged 1,670 pounds per square inch, with 80 per cent. wood failure. When tested wet after soaking for three days, they gave an average strength of 1,280 pounds per square inch, with 42 per cent. wood failure.

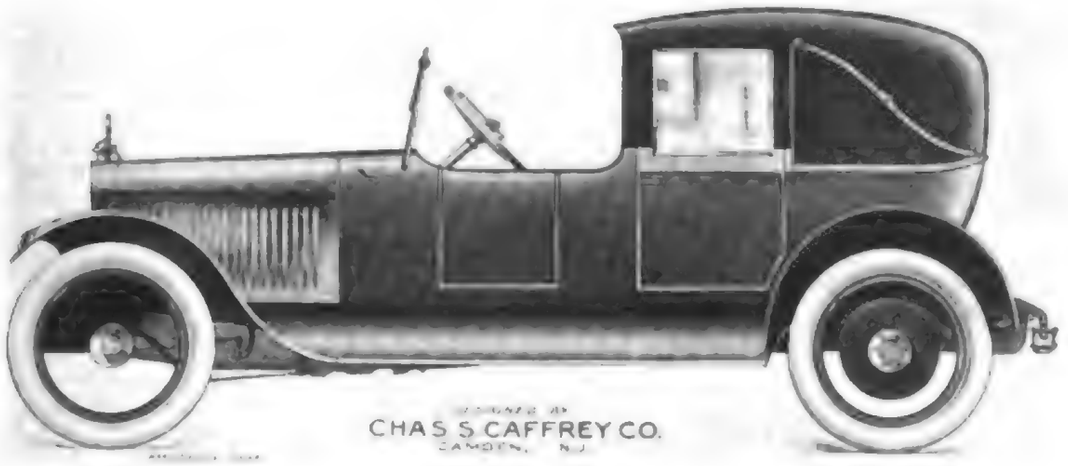
Gluing Wood Coated With Varnish or Shellac

Glue joints between wood surfaces which have been coated with shellac or varnish have low or very uncertain strength. This has been thoroughly demonstrated by a recent test at the Forest Products Laboratory, Madison, Wis.

Sixty pairs of test blocks were prepared in which one or both wood surfaces were varnished or shellacked and were joined with either casein or animal glue. A great many of these blocks fell apart before testing, and all which held together long enough to be tested sheared apart in the glue joint and not in the wood.

The highest strength value obtained was 1,712 pounds per square inch, which is low for casein glue. The other values were 1,000 pounds per square inch or less. It is evident, therefore, that all shellac or varnish should be carefully cleaned from wood which is to be glued, if high strength is desired.

A few blocks were joined using shellac as a glue over surfaces previously coated with shellac. The maximum shear strength obtained was 1,425 pounds, the minimum 450 pounds, and the average, 758 pounds per square inch. These values are low and do not indicate that shellac has gluing properties which compare favorably with either casein or animal glue.



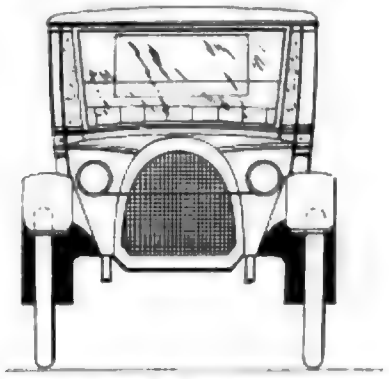
A CLASSY LANDAULET BODY DESIGNED AND BUILT BY CHAS. S. CAFFREY CO., CAMDEN, N. J.

Coupe Mounted on Oldsmobile Chassis

BY GEORGE J. MERCER

Inside drive bodies formerly were supposed to be used for the winter season only, but of late there has been a growing tendency to use them for all the year round, especially for town use.

The coupé makes a good shopping and theatre car. Ventilation by means of the large windows insures all the fresh air that most people wish for, and the offset driving seat make it quite right to have a chauffeur, although the seat is close enough so that the driver is still with the others of the party,



FRONT VIEW OF COUPÉ BODY.

provided the owner drives. It is a ladies' car and a family one as well, because the accommodation for four passengers is sufficient for the average family.

This design has been illustrated very comprehensively. The picture illustration contains the large side elevation and the two miniature views give the front and the top, with the arrangement of the seating. The extra tire is at the rear, as well as the luggage compartment, and in addition there is a small space at the rear of the driving seat, inside the body, for storage.

The extension at the front is different from the average coupé. This is an adaptation of the practice in vogue on some sedans. It is different from the average because the extension is divorced from the side line of the body and is narrower than the body line.

The bottom of the extension setting on top of the cowl panel, as illustrated on the three views, the side line of the body is defined by a molding that runs from the radiator to the back panel. The side windows of this extension are stationary. The front is three piece, the lower is stationary and the outer upper is a visor. The inner window swings inward and the door glass drops all the way down for ventilation. There is a ventilator in the top of cowl panel and the rear glass is large and stationary.

The lines are sharp, well defined and angular throughout. The roof has slightly rounded corners, and is made of metal. Better results are obtained by having the edges made with a small radius.

The construction views comprise the side elevation, and half-views of the top, bottom, front and rear views. Dimensions of the principal framing pieces are given. These views show the wood framing independent of the panels and moldings and clearly define the method of construction. This body is entirely of wood framing, and of course ash is best, because it is light, strong and resists decay, but maple can be used for some parts. This latter timber is not durable where it is liable to become wet, as maple cannot resist the action of water as ash does.

The dash is wood and there is a framing piece between this and the first post to carry the molding. The corner post that forms the extension is framed to the top of a cross bar; the bar across the front between these posts is likewise fastened to the same bar, and the lower side rail of the extension is fastened to the belt bar—all this before the panel is put on.

The cowl panel is turned up along these corners and fastened under the upper double molding. This will make a strong job, because wood to wood is best for framing, and the panel turning up will obviate corner joints and help to stiffen and hold the uprights in place. The cowl panel is simply a top sheet, the joint being covered by the lower double molding where it joins the perpendicular panel.

The making of angular fronts has been an unsatisfactory job in the past, because the plan of using metal corner castings necessitated either putting the posts on the outside of the panel, which does not look well, or fastening them under the panel, where if they work loose, the entire panel becomes loose or broken. This is entirely avoided in the manner explained. Of course there will need to be a husky corner iron on the inside of the top cross bar and the first pillar.

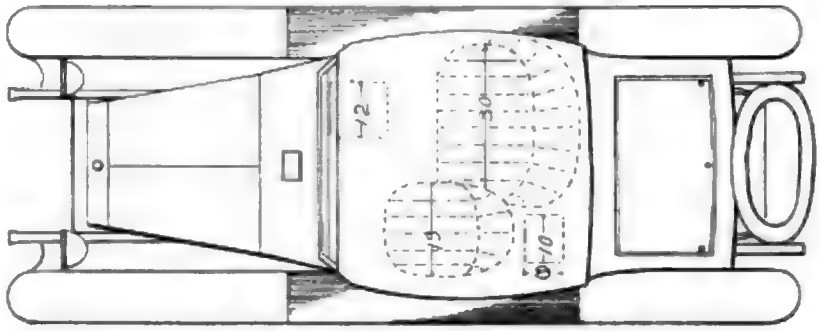
The wood post above the belt is covered with metal and turned in as is the custom with door pillars, but the molding up the side of the corner post will enable the workman to use one sheet for each side and one for the front—not a difficult job for a competent man.

The rear compartment also is easy to panel. The top sheet joins the sides under the molding and the side sheet will be one piece from the door opening back. It is joined to the upper panel under the molding.

The upper panel is the most difficult This is one piece for the two sides and the back. The corners are square and are welded to the roof sheet at the corners. The roof is in one piece, laid over the wood bows. Two thicknesses of Lenox blue wadding, laid between a sheet of cheap muslin or factory cloth underneath and on top will form a buffer to prevent the sound of "belling" of the metal that was so objectionable when metal roofs were first used.

"Tee" molding is used on the doors, along the bottom and all the way up to the top of the sides, and covered joint curved hinges 1¾ inches wide are used, the location being given on the pillar diagram. The framing of the top rail is shown up to the line of the inside of the stock, the same as on any shop layout, and the sweep of the roof between these points is indicated in inches at the center and front and back on the side elevation. Likewise the centre of the lock holt is shown. The lock has the Yale attachment as indicated by the circle of the washer in the centre of the panel between the moldings in the side elevation of the picture. The handle hole is 2⅝ inches below this centre.

The lid of the rear compartment is hinged at the end nearest the body as shown by the arrow indicating the line of travel. This hinge is simply a commercial piano hinge, set up ¼ inch above the deck panel in the centre. It must be straight and therefore will project above the deck panel more at the ends than in the middle. The lid is ¼ inch above, along the line of the opening, to the under side of the "tee" molding that forms a border. The idea is to permit a ⅛ inch plate fastened to the body to project this distance above and keep water from running into the well. This plate will be on the three sides not used for the hinge.



TOP VIEW OF COUPÉ BODY, SHOWING SEATING ARRANGEMENT.

The fastening is by two spring box locks, one at each rear corner, and the keyhole covered with a keyhole plate. Also there is a Yale lock in the centre of the back line for safety when car is left standing. This rear compartment is quite large, and is useful for many purposes. There is also a compartment at the rear of the driving seat, indicated by the door dimensions on the miniature top view. The other dimensions are indicated

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by figures on the construction views. There will be space under the seats besides, that under the rear is indicated by figures showing the height.

The top of the compartment at the rear of the driving seat forms an arm rest for the occupant of the rear seat who is next to it, and it is well to mention that an arm rest to be comfortable should never be more than 9 inches above the cushion. This will insure the arm laying easy without having the feeling of being raised too high.

The depth of the seat cushions is also shown in figures, the rear being 10 inches and the driving cushion 8 inches. The folding seat under the cowl is an emergency or child's seat only, and can never be used with much comfort by an adult. It is quite fair for its kind, as the knee room is not crowded and the lower part of the front glass is stationary, so there will be no objectionable draft to contend with. This seat is hinged strongly to the side and folds compactly out of the way when not required.

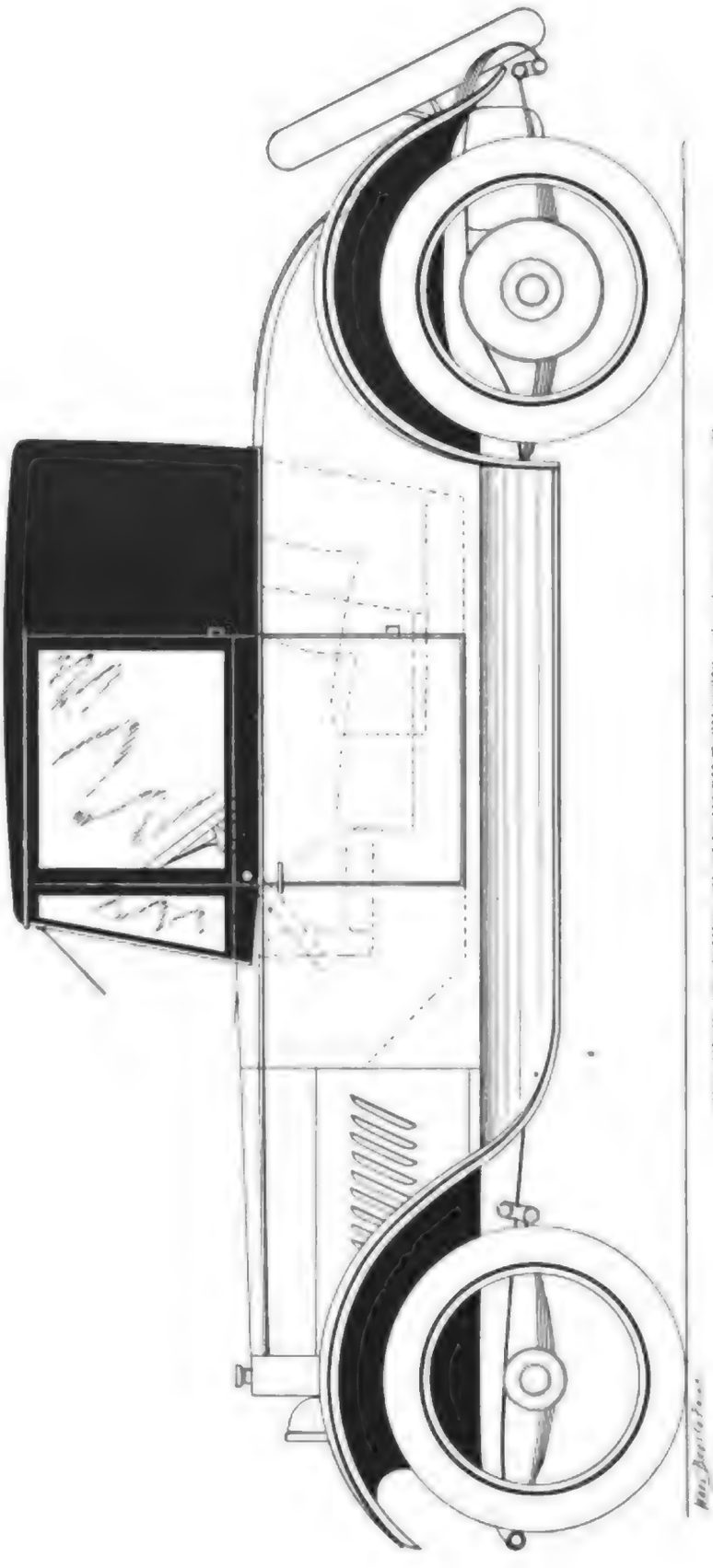
The rear of the driving seat is a metal panel, shaped as indicated, and the framing to form the top of the luggage compartment is easily fastened to this at its front end. The trimming of the back is 6 inches, which is all that is ever required, and for the rear seat it is a little thicker.

The door glass is operated by a regulator and runs in a straight groove. The layout is shown on the pillar diagram. The glass drops all the way down.

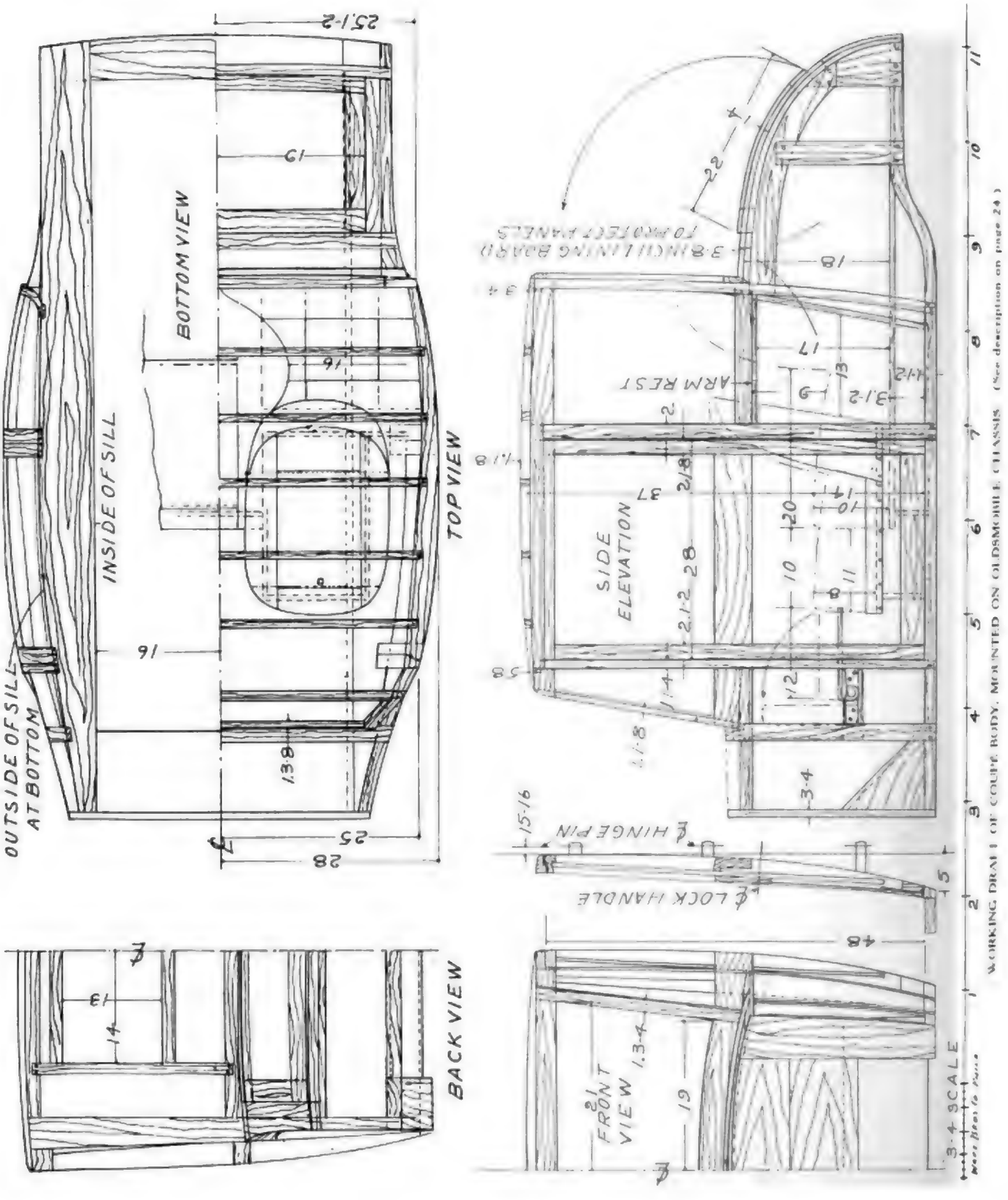
The metal best adapted for this body is aluminum for custom work. Where quantity work is manufactured sheet steel is recommended, because generally stampings have to be used to form the stiffer metal. In this design, sheet metal can be used to advantage on all the lower panels as there is very little sweep and the joining comes under a molding. This will save some in the cost and be in every way as desirable. For the upper panel work, where it is required to turn the metal around the pillars that form the window openings, aluminum is the only metal to be considered.

The standard parts of the chassis that can be used are the fenders and the tire carrier. The engine hood will have to be new as the stock hood is too round to carry the design shown. At the rear the luggage compartment is just the width of the space between the rear fenders; therefore the fenders will be fastened to the body and no wheelhouse is required.

The painting combination for this body and chassis will require modest colors. It is essentially a town car type and in no sense loud. The rear closed quarter spells conservatism and the best color is the standard blue, with black fenders and chassis, or all blue and a very little striping, either of a lighter blue or white. The metal appointments are silver finish, including lamps and door handles. The interior appointments consist of headlight, corner reading lamps and watch on the instrument board, with a smoker's set at front. The compartment in-



SIDE VIEW OF COUPE ON OLDSMOBILE CHASSIS. See description on page 24.


BOTTOM VIEW
INSIDE OF SILL
OUTSIDE OF SILL AT BOTTOM
TOP VIEW
BACK VIEW
SIDE ELEVATION
ARM REST
HINGE PIN
LOCK HANDLE
FRONT VIEW
3-4 SCALE
WORKING DRAWING OF COUPE BODY, MOUNTED ON OLDSMOBILE CHASSIS

side will give all the space for carrying that is required and pockets in the trimming can be dispensed with.

The trimming should be very comfortable. Good springs, well set up, and the space given will allow for the maximum to insure easy riding. The design of trimming is still the plain, French plaits, but this could be varied on this design by the use of one or two cross plaits fastened with buttons. This latter design allows the trimming to remain shaped a little better and it looks well for a change. The color of the goods is preferably the medium light grey or mixed, in which grey predominates. Tapestry or plush can be used because this car must look "comfort," and the service will not be rough, so that the trimmer is able to carry out a plain yet rich looking plan, which would not be possible on a car that was a more general purpose one than this is.

Balance is the test of final approval, and the properly balanced product that this design should represent is that when finished, nothing ornate or loud will be on the job. It should be a rich, pleasing design throughout, with no conspicuous or gaudy features.

A Smart Sedan Body with Distinctive Lines

By KINGSTON FORBES

Closed cars are very prone to look much alike, and this is especially true in relation to the main section of the body. The radiator, hood and cowl retain the manufacturer's standard shape, and when these are distinctive the make of the car can be readily seen, but should the manufacturer use the prevailing narrow radiator and high hood lines there is no way of telling what make of car it is without looking at the monogram.

General Description of the Design

With a view to obtaining a distinctive closed body this design is suggested. "Straight lines" is the keynote of the design, with a flat bevel line that starts from the front of the radiator and runs completely round the body and back to the front of the radiator on the opposite side, as the main feature of the design. Harmony and rhythm are obtained by the use of the small bevel surfaces and flat surfaces.

The radiator has flat sloping top, sides and bottom, and the general lines are carried back to the shroud, where they blend into the slightly convex top on the shroud and the convex sides of the body. The slight convexity of the shroud and side panels on the body relieves the flatness and prevents the body panels from appearing to have hollows and buckles, which is what would happen if the panels were made completely flat.

Panels and Doors

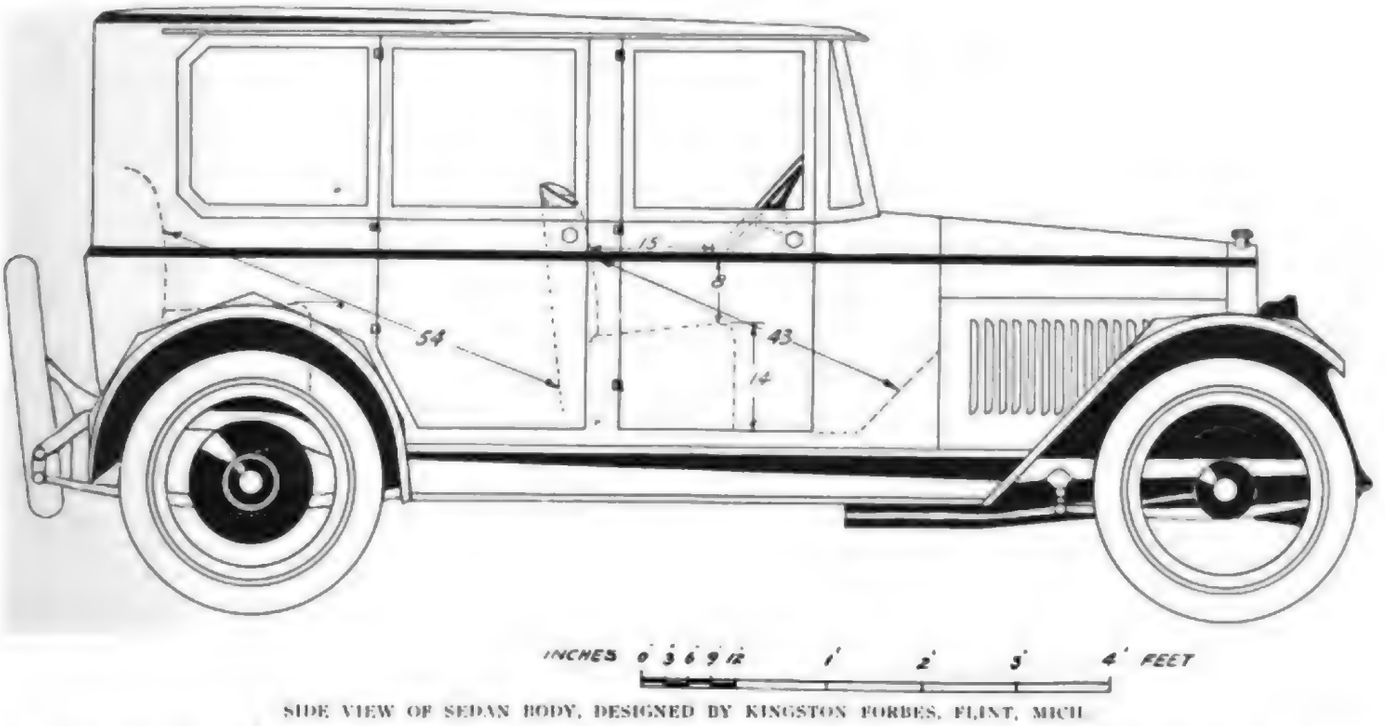
The back panels of the body are comparatively flat, with sharp corners where they join the side panels. On the top of the body at the back a small flat bevel is made. This runs out on the sides about half way to the front and tends to break up the flatness of the back. The doors have sharp corners and hexagon shaped handles are used. Bevel corners are made on the rear side windows, while in the rear two glass windows are provided instead of one large one, which is the prevailing practice. It will be seen that the bevel note is also carried out in these rear windows by the corners beveling off.

A new idea in mudguard and running board aprons is seen. This has been developed in order to carry the bevel note throughout the car. On the running board apron a bevel is used instead of the customary radii, the bevel increasing in size as it goes toward the front. This relieves the surfaces that would otherwise be very flat and at the same time gives a novel effect. In order to get the flat surfaces on the mudguard, without reducing their effectiveness in protecting the car, they are made to conform to the wheel radii on the lower edges, while the upper surfaces are flattened out, which gives them polygon shapes. The front edges of the front mudguards and the rear edges of the rear mudguards are made straight.

The car is designed for all-round service, so a medium wheel base of 125 inches is used, which gives a good wheel base for country service and does not make too large a car for city use.

Top-Heavy Effect Overcome

The overall height is kept as low as possible and the high hood and shroud line give a very well balanced car and eliminates the top-heavy appearance that is so characteristic of closed body designs. High side panels also conceal the windows when they are lowered, making a very neat effect when driving in the hot weather with the windows down.



SIDE VIEW OF SEDAN BODY, DESIGNED BY KINGSTON FORBES, FLINT, MICH.

It will be noted that the flat front appearance is avoided by using two small curved corner glasses, one on each side of the windshield; the windshield then has a wedged shape, which conforms very well with the general design. A single glass is used for the upper section instead of two, and a rubber weather strip is fitted between the glasses to make them weatherproof.

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Advantages of Four Door Arrangement

By using four doors, an unusual departure is made from the general Sedan practice. The doors are hinged at the rear on to solid door posts. None of the posts are removable, but ample ventilation can be obtained by dropping all the windows. By making the door posts solid a much stronger body is assured and much better support provided for the doors, which helps to reduce the possibilities of rattling noises.

For general service four doors are indispensable, as there are a great many occasions when the passengers wish to get out on the left side, which, with the two staggered doors, is a difficult undertaking for the passengers in the rear seat, they having to squeeze between the front seat division and then get through under the steering wheel.

There are a great many houses that have their garage on the left side of the house, which makes it desirable to have an easy exit on the left side. This is only one of the many reasons that makes the four doors so desirable.

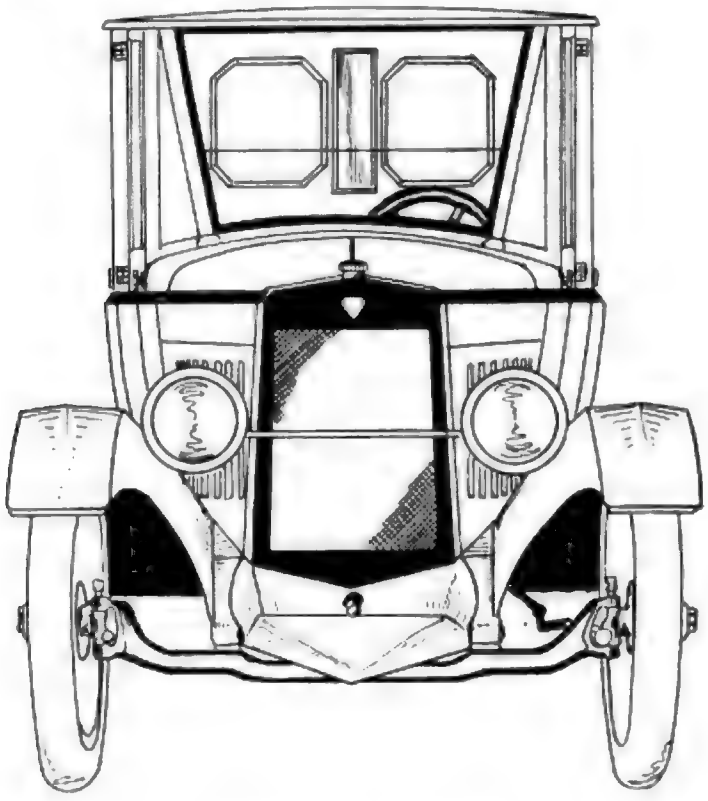
As the necessity of bucket seats is eliminated by the addition of doors, a solid front seat back is used. This gives the driver and passengers a great deal more comfort and room than can be obtained with bucket seats, and at the same time the construction of the body is both strengthened and simplified.

The Upholstering

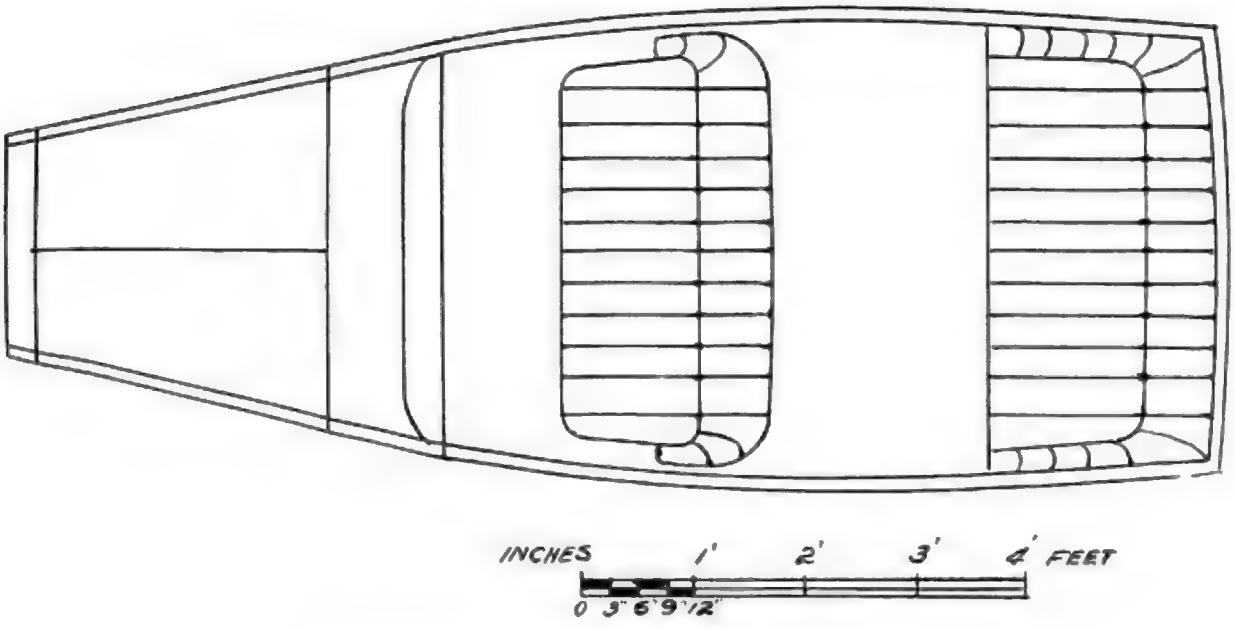
The upholstering is done in the French buttonless plaited style, leather or a good leather substitute being used for the front seat and a gray figured cloth for the rear seat. The front seat is the one subjected to the most wear and tear, and the driver, no matter how careful he is, can not help getting his clothes and hands soiled when changing a tire or spark plug. This will soon mar a cloth-trimmed seat. For this reason a leather or leather substitute is recommended for the front seat, while the rear seat, being generally used by ladies, will be more acceptable in a cloth trimming.

Arm rests should be provided on both the front and rear seat sides, as this will be a convenience which will be greatly appreciated. On an open touring car the driver and passengers can rest their arms on the top of the body rails, but on a closed body the sides are generally too high to permit this when the windows are down. When the windows are up it is very uncomfortable to ride for any length of time without some provision being made to rest the arm.

Curtains should be provided for all doors



FRONT VIEW OF SEDAN BODY.



TOP VIEW OF SEDAN BODY, SHOWING SEATING ARRANGEMENT.

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and windows, as it is trying for any one to ride in the car on a bright sunny day and not be able to shade the eyes.

The Seating Equipment

The seat positions are details of perhaps the greatest importance in the car. The positions shown in the design are good average seats and give plenty of room, but they can not possibly suit every one, and when a special body is being built the purchaser should have the seat positions, the backs, and cushions, made and located to suit his requirements. Good seat cushions are necessary in order to get any satisfaction out of the car, and there is nothing that can cause so much dissatisfaction as a poor seat cushion.

To give all-round riding comfort the cushion should not be too soft, and the springs should not be too long, as they will tend to throw the passengers up when a rough spot in the road is encountered. A fairly stiff spring with a pad not less than two and one-half inches, made from the best quality curled hair, will give fine satisfaction.

The closed car equipment should be very complete, as luxury is the requirement that warrants its purchase, and real luxury is not obtained unless all the small but necessary details and fittings are provided.

Mountings and Accessories

In the upholstery, proper and liberal pockets are provided for; vanity case and cigar cases in the rear, with a large pocket on the back of the front seat. In the front, two pockets are located in the right door, while in the left door provision is made for a pocket to take the necessary tools. A rail for wraps and robes is attached to the back of the front seat. Footrests are provided, preferably made from hair, and provided with straps by which their position in the car can be adjusted. A hat rack, umbrella stand, cigar lighter and ash tray will be found serviceable equipment.

Heating and Lighting

Winter driving can be made as comfortable as it is in summer by fitting a heater in the floor. This is connected with the exhaust pipe of the motor and taps the hot gases from it when it is found desirable to heat the car.

The lighting of the car should be carefully arranged. Two pillar lights in the rear and one dome light will be found to give good results. Each light should have an individual switch. A small light will be required on the instrument board and should be so arranged that it will not reflect any light in the driver's eyes and at the same time it should light up all the instruments. Lights for the running board are very useful. These are either attached to the sill of the body or on the side apron, and should provide ample illumination to light up the running board.

A clock, of course, is necessary, and a good position to set it is up over the top of the windshield near the roof. This will enable all the occupants of the car to see the time without any trouble. It will also be found convenient to place a small mirror adjacent to the clock over the driver's head, so it will reflect a view of the road through the rear windows. If this is properly located it will give a better view there than will a mirror located on the mudguard.

By having two rear windows instead of one it is possible to get a small mirror set between them. This is a small convenience which the ladies will appreciate. Spare tires are carried on a tire carrier in the rear, and while there is a tendency to carry the tires on the front of the car they obstruct the accessibility of the hood when it is necessary to oil or adjust the engine.

The general plan of the body is one that will fit any of a large number of well known chassis, and one that any wood body maker could produce without any trouble for a reasonable price. The side elevation is shown in sketch No. 1. The radiator and general general body line are shown in sketch No. 2, as seen when facing the car. Sketch No. 3 shows the general outline plan and seat positions. The car painting is left to the individual taste.

Woodwork on Automobiles

By C. M. Mackay, in "The Wood Worker," Indianapolis, Ind

Up to quite recently, had any one asked me where to look for the highest development along the line of efficiency, I would have said, in the automobile plant. The magnitude of the industry and the large number of efficiency experts engaged to promote efficiency (for almost every plant has its efficiency staff) would naturally lead one to believe that little remained to be desired along this line. But I have had occasion to look into the matter a little, with the result that my opinion has been greatly modified.

It is true, there are branches of the industry which are highly efficient, but I have found shops where some branches are decidedly otherwise—notably the wood-working and finishing branches. And this condition is to be found in some of the largest plants in the country. The condition can hardly be charged to a lack of efficient help, because so far as I was able to observe, the trouble was due to wrong methods of doing the work (for which the heads of departments are responsible), rather than to inefficiency on the part of the workmen.

Shop efficiency does not mean training men to do good work in the hardest way; to my way of thinking it means doing the best work by the easiest and quickest possible method. Some handsomely-finished cars are turned out of these plants, but the cost—well, only automobiles could stand it.

The finish on the higher-priced sedan and limousine is equal to the finish on a high-grade piano, but the cost is many times as great, and all because the woodwork has not been properly cleaned up. No one expects a carpenter shop to turn out as fine work as a cabinet shop; and the work done in some of the automobile plants is not even good carpenter work, when it ought to be high-grade cabinet work. And the finishing department seems to have become so accustomed to this poor woodwork that it accepts it as a matter of course and does the best it can with it.

I have seen shaped work go direct from the machine to the finishing department, and the latter was expected to make a good finish. To prepare this rough wood for a smooth finish it would get a coat of lead primer and was then glazed with putty and sanded, then more putty if necessary and more sanding. One-half the amount of sanding in the wood-working department, that was given in the finishing department, would have put it in pretty fair shape and rendered unnecessary the glazing, which is a slow, tedious job on some kinds of work.

Another thing observed was the lack of care in cleaning off the surplus glue from glue joints. In one shop where this was done the wood was torn away, and the holes thus made had to be filled with putty to make a smooth surface for finishing. This surplus glue should be scraped off before it becomes so hard that the wood will pull away with it.

In the finishing, or paint department, not a few shops show the same lack of efficiency. Automobile finishing seems to be a development of the old method of carriage finishing, as distinguished from piano and furniture finishing. If automobile and piano and furniture finishers could get together and exchange experiences an dideas, each could learn something from the other.

Filler, as used for filling the pores of wood in piano and furniture finishing, seems to be all too little known in some automobile shops—either unknown or feared, because it is not used. The method of filling is that of putty and the glazing tool—a method that is both inefficient and costly; inefficient because it does not make as permanent a job as wood-filler would do. Wood filler applied in the liquid state enters the pores of the wood, works itself among the fibers and secures a permanent hold.

With putty it is different. In the paste form it is pressed into the pores, but it cannot penetrate as deep nor work itself among the fibers as the liquid filler will do. To insure a full pore one must leave a sufficient amount on the surface to allow for shrinking, and putty does not make a durable surface or foundation for a finish. It is costly because the process is slow, very slow, compared with the process of wood-filling. Then after it is filled it has to be sandpapered, which takes up a great deal of time.

If the woodwork on automobiles were cleaned up as well as it is cleaned up in most furniture factories, a great saving in cost would result. Up to the present time most of the car has been made of metal, and

(Continued on page 33)

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Twelve Passenger Omnibus on 110 Inch Wheelbase Chassis

By CHARLES A. HEERGEIST

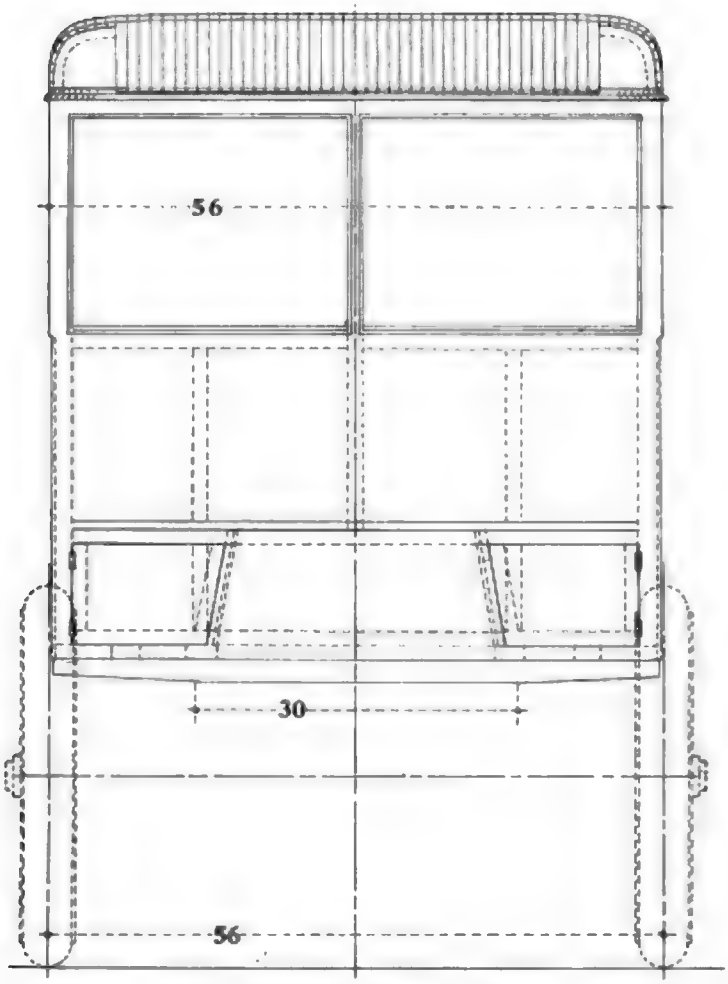
Construction of the Body

The body is recessed on rear end to give room for rear wheels, but this same space is enclosed with a door in front so it can be used for packages. These spaces are directly under the seats and arrangements are made to enter the recess spaces from the inside. The rear end has also spaces under the seats, but are smaller than the front ones. There are doors on rear end and also lids on the inside, either on seat frames or on heel boards.

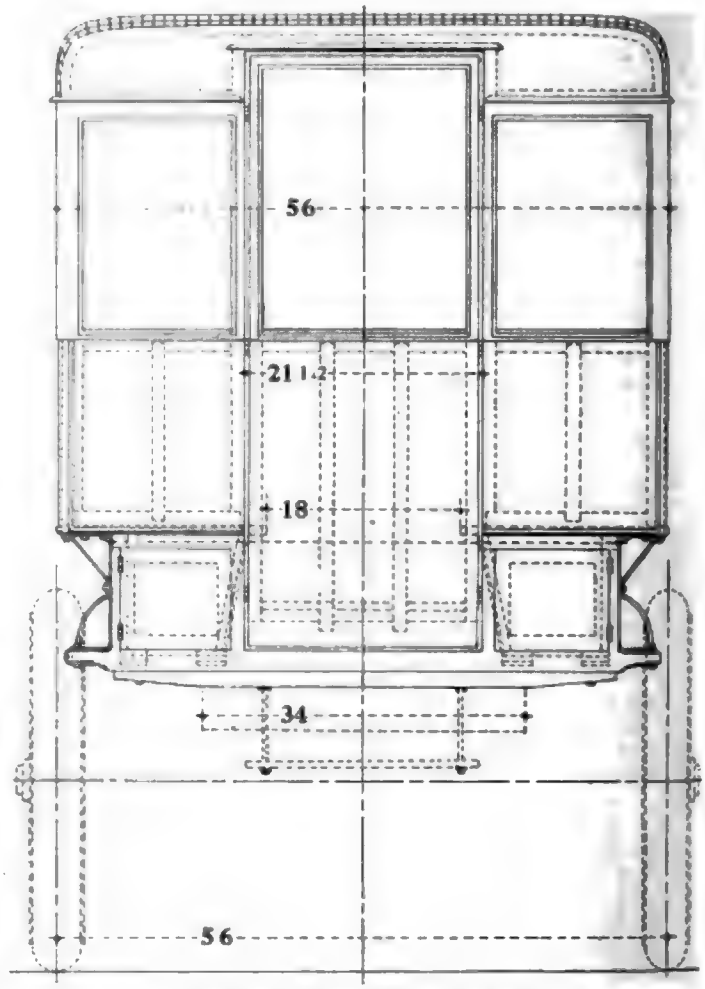
There are three separate sills each side on front part of body, and two separate sills each side on rear part of body. The sills are directly above the frame the whole length of body, two inside the recess, and two short ones outside the recess, forming the width of body. The two main sills are above the frame and connected with end, and all other cross bars, front and rear. The recess cross bars are connected with all the cross bars except the front end cross bar, and the outer body sills are connected with four cross bars only. It will be seen that by this combination, cross bars and sills bolted together, a very strong combination and foundation can be obtained. The spaces between the sills are closed up with bottom boards. There are twelve cross bars, with a space less than nine inches between, except under the front seat, where one cross bar can be dispensed with.

The first three posts from the front on each side are framed in the outer sills, and the other three rear posts on each side are framed in to the seat frames, which form the recess. The twelve posts are lapped to the top rails, also the twelve bent bows. The front ends of top rails are curved and connected with the front cross rail, with a key on each side, which can best be seen on half bottom view.

The top is covered with ¼ x 1 inch slats, joining each other without any opening. These slats or strips are beaded on the inside surface and do not need any leveling on the outside. Tops of this kind are covered with leather substitute, and the edges are covered with drip moldings. The joining of the leather substitute on upper rear end of bow is by lapping over, and the edges are covered with a rounded molding, ¼ x ⅞ inch. For first-class work the rear end open spaces are closed up with ¼ inch thick panels, as are also the open front ends shown on front elevation.



Front View of Twelve Passenger Omnibus.

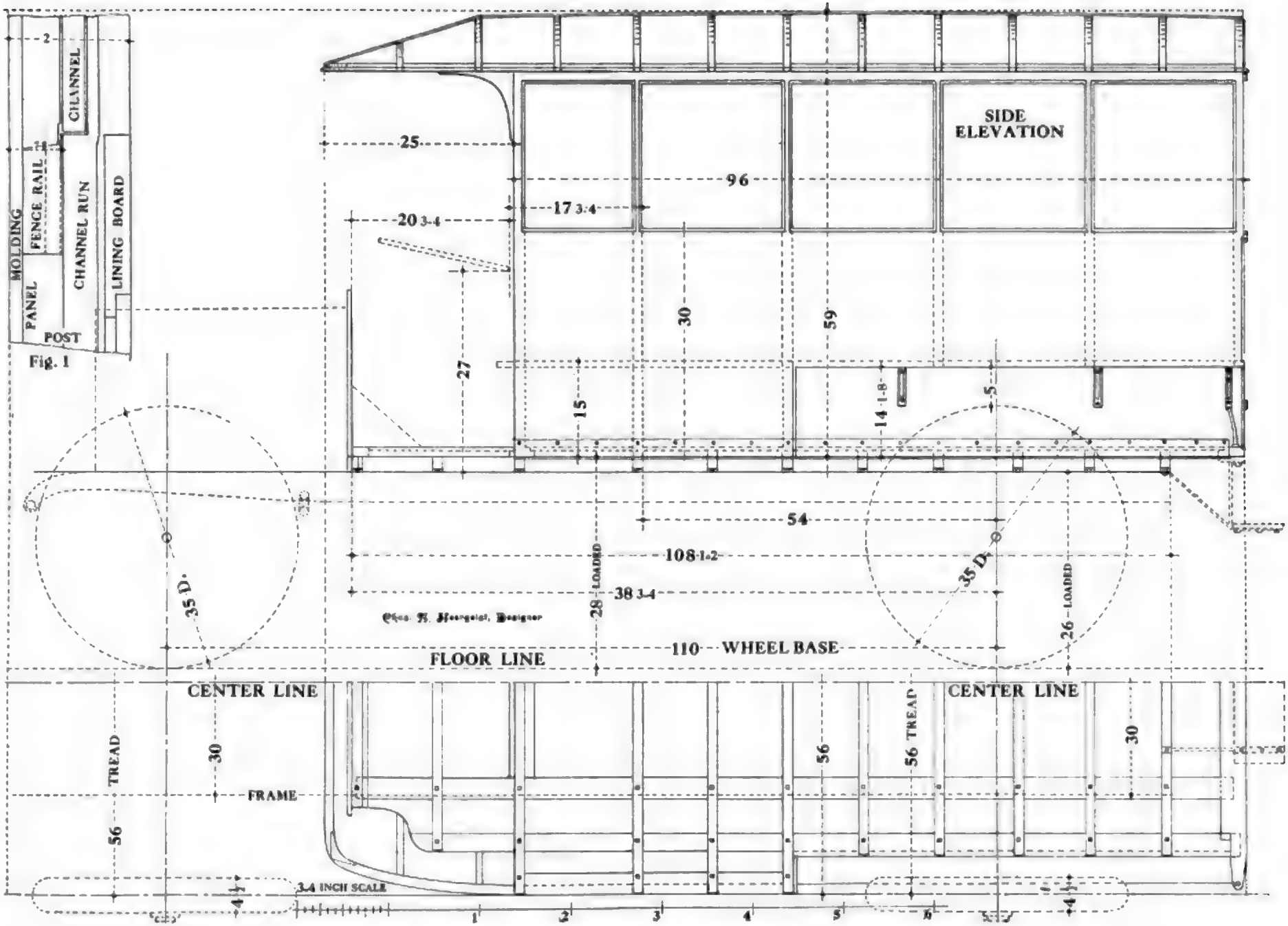


Back View of Twelve Passenger Omnibus

The posts are only 1⅛ x 2 inches except the end posts, which are 1½ x 2 inches, and all glass frames are made to drop; consequently the spaces must be economized for a thickness of 2 inches.

Fig. 1, drawn to half size, will explain how to drop the frame for a pillar 2 inches thick. The molding on pillars is only ⅜ inch thick; the fence rail, including the molding, is ⅞ inch thick; the iron plates which are screwed to fence rail and glass frame are ⅛ x 1 inch, the thickness of glass frame ½ inch, and inside lining ⅛ inch thick. For the glass frame ⅛ inch "play" is needed and for the glass lifter ⅛ inch "play" is given. Thus it will be seen that a 2 inch thick pillar will be suffi-

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WORKING DRAFT OF TWELVE-PASSENGER OMNIBUS BODY. (See description on page 30.)

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cient to lower and raise the glass frame, same as if the pillar were 2½ inches thick. The space is saved by the iron plate hooking over the fence rail plate.

The fence rail plates are tapered. The one on the glass frame is tapered on inside surface and the one on fence rail is tapered from the outside. Glass frames made from channel irons or brass are more serviceable, improve the appearance and give more light to the interior of the body. Besides, the tendency to warp or swell is obviated.

Number of Pieces, Kinds of Timber and Dimensions for a Twelve-Passenger Omnibus Body, with Rear Entrance

Body Dimensions

	Inches
Length of top from front end to front post	25⅜
Length of body from post to post outside	96
Length from dash to front post	21½
Extreme height of body	60
Extreme width of body outside of posts	56
Inside width of body at base and end posts	52

Bottom Frame Sills and Cross Bars

No. of Pieces		Kinds of Timber	Thickness Inches	Width Inches	Length Ft. In.
1	Front end body cross bar	Oak	1⅜	2½	2-8
1	Front cross bar under seat	"	1⅜	3½	2-6
1	Rear end cross bar	"	2¼	3⅛	4-8
11	Cross bars under body	"	1½	3	4-8
2	Main sills above frame	"	1⅜	3	10-
2	Recess sills	"	1⅜	2⅝	9-3
2	Outside sills	"	1⅜	2⅝	3-3
2	Front bottom boards	"	⅞	11	2-4
2	Bottom boards	"	¾	5	10-
2	Bottom boards	"	¾	3	3-3
4	Bottom boards	"	¾	7	8-

Posts, Rails and Bows

1	Front center post	Ash	1½	2	4-6
2	Front end corner posts	"	1⅜	2	4-6
4	Front inside posts	"	1⅜	2	4-6
4	Rear inside posts	"	1½	2	3-6
2	Rear end corner posts	"	1⅜	2	3-6
2	Rear end standing door posts	"	1½	2	4-9
2	Side upright pieces	"	⅞	12	5-3
2	Seat boards, forming rail	"	⅞	19	8-3
2	Side fence rails	"	⅞	2	8-3
2	Side top rails (curved front)	"	1⅜	3	10-
11	Bent bows	"	1	1½	55-½
1	Extra front bent bow	"	¾	1⅜	52-½
1	Front cross top rail	"	1⅜	1½	4-
1	Upper front cross rail	"	2	3	4-6
1	Front cross fence rail	"	⅞	2	4-6
1	Lower front cross rail	"	1½	2	4-6
2	Rear upper cross rails	"	2	3	1-6
2	Rear fence rails	"	⅞	2	1-6
2	Lower rear cross rails	"	1¾	3	1-6

Rear Door

2	Door pillars	Ash	1½	2	4-9
1	Upper rail	"	⅜	1½	1-11
1	Fence rail	"	⅜	2	1-11
1	Lower rail	"	1¾	3	1-11

Front, Side and Rear End Panels

1	Panel across front	Poplar	¼	19	4-6
2	Main side panels	"	¼	19	8-3
2	Lower front side panels	"	¼	13	3-3
1	Door panel	"	¼	22	2-6
	Beaded top strips	"	⅛	1	11-
2	Heel boards	"	½	12	8-3
	Stuff for the four small doors	Ash	1	1½	16-
4	Small door panels	Poplar	¼	10	15-
	Drip moldings	Ash	½	1	68-
	Strainers	"	¾	1¾	20-

Peace-time Applications of War-time Research

One of the greatest of the many great lessons taught by the war is the value of research work. No sooner had war been declared than the need arose for special researches and experiments of many and varied kinds, and all available facilities were pressed into service. Everything possible was done to speed up research work, some laboratories, like the Forest Products Laboratory at Madison, Wis., for instance, operating upon a three-shift basis.

As a result of this high-pressure work, a tremendous amount of valuable information has been amassed, and one of the problems of the immediate future is to apply this information, insofar as it is applicable, to peace-time pursuits and conditions.

In the case of the researches conducted by the Forest Products Laboratory, in co-operation with various bureaus of the War and Navy Departments, there is no question concerning the peace-time value of the data secured during the war. In certain fields, such as kiln-drying, boxing and crating, and the study of the mechanical properties of wood, fundamental pre-war studies have been continued and developed.

In other fields, such as those relating to glues and plywood, no work had been done prior to the outbreak of the war, and it was necessary to start entirely new fundamental studies. The information secured is obviously directly applicable to all wood-using industries. Much of the fundamental work already mentioned was carried on primarily in connection with the aircraft program.

In addition, much special study was devoted to the design and manufacture of aircraft parts, including propellers, beams, struts, ribs and other members. Notwithstanding the special character of these studies, the knowledge gained through them has direct application to the manufacture of all fine wooden articles, and forms an excellent basis for future researches on laminated and built-up construction of all kinds.

The laboratory plans to stimulate the commercial application of the accumulated store of knowledge just as much as its reduced appropriations will permit. All those interested are urged to communicate with the Director or call at the laboratory in person.

Effect of Age on Casein Glues

That casein glues can be successfully used any time after mixing up to the time they become unworkable, is the conclusion drawn from a number of tests at the Forest Products Laboratory. Ordinarily, casein glues exhibit a life of from 3 to 5 hours, though there are some which remain usable over a much longer period. The laboratory has from time to time received inquiries as to whether or not these glues could be relied upon to give as satisfactory strength and water resistance after three or more hours as they do immediately after mixing.

To study this question, shear blocks and plywood panels were made up hourly start-

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ing at the time the glue was mixed and continuing until the glue became so thick that it was unworkable. The blocks were allowed to season for seven days and were then tested in shear in the usual manner; the panels were given shear tests, 8-hour boiling tests, and 10-day soaking tests. Results of the tests on one commercial glue are shown in tables 1 and 2. These are typical of the results obtained with other glues.

Table 1. Results of joint strength tests:

Age of glue in hours	Average shearing strength in lbs. per sq. in.	Percent good wood surface in failure
½	2170	24
1½	2137	51
2½	2276	58
3½	2453	3
5	2098	23

Table 2. Results of plywood water resistance and strength tests:

Age of glue in hours	Condition after boiling 8 hrs.	Condition after soaking 10 days	Average shearing strength in lbs. per sq. in.
½	O.K.	O.K.	261
1½	O.K.	O.K.	289
2½	O.K.	O.K.	349
3½	O.K.	O.K.	294
5	O.K.	O.K.	257

Shrinkage in "Compression Wood"

"Compression wood" is a term applied to wood of an abnormal growth, which is considerably heavier than normal wood and is usually further distinguished by very wide annual growth rings, a lack of contrast between the spring and summer wood and a relatively dark color. How this abnormal growth is caused is not definitely known, although the theory has been advanced that excessive leaning of the tree during growth produces it, the "compression wood" being formed on the lower or leaning side.

A structural timber containing "compression wood" was recently received for examination at the Forests Products Laboratory Madison, Wisconsin. The timber had failed in tension in the "compression wood." Large cross breaks had opened up across the grain, and rendered this portion of the timber useless in withstanding further stresses. The "compression wood" was very brash and exhibited low strength in mechanical tests, except in compression parallel to the grain, in which it was about equal to the normal wood. Its specific gravity was considerably greater than that of the normal material.

The chief difference between the normal and abnormal wood, however, was in the matter of shrinkage. The "compression wood" was found to have a longitudinal or end shrinkage six times as large, and radial and tangential shrinkages less than half as large as those of the adjacent normal wood.

In the beam examined, the tendency of the "compression wood" toward excessive shrinkage had been resisted by the normal wood, with the result that the "compression wood" was actually pulled in two.

Don't wait to get that large sum for investment. Put all the little bits in Thrift Stamps and War Savings Stamps and you will soon have a large sum invested.

Woodwork on Automobiles

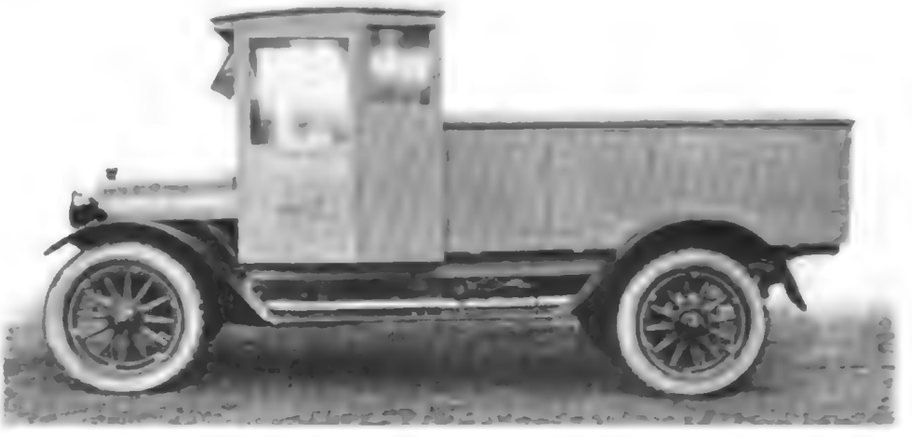
(Continued from page 29)

the finisher has given more thought to metal-finishing than to wood-finishing. The time is coming, however, when automobile bodies will be made largely of wood, and competition will be so keen that cost and price will be a big factor, then the finisher will have to economize at every turn, as is now necessary in the piano and furniture industry.

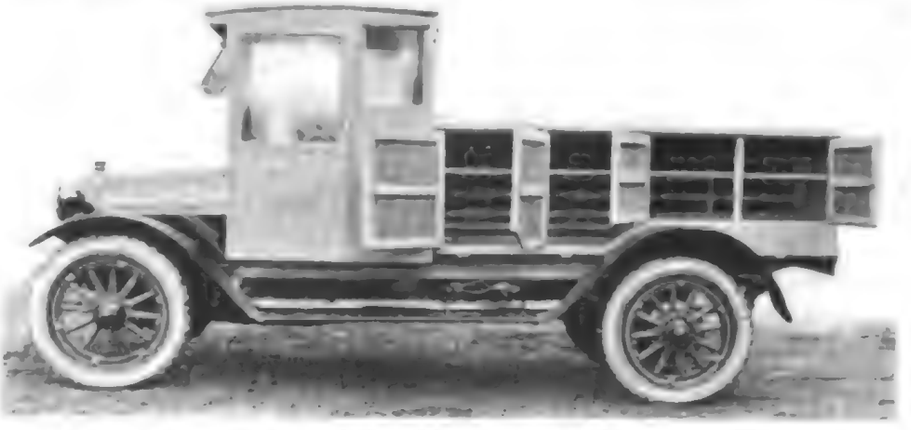
The automobile finisher frequently comes in contact with what is called "pitted" metal; that is, metal that is scaly or full of small pits or holes. The usual method of filling these pits is by glazing with putty; but as I said before, putty does not make a permanent job. A permanent job may be made by brushing on a coat of wood filler and sanding it smooth after it becomes hard. Do not rub it off, as is done in the case of filling wood.

A good filler for this purpose may be made as follows: Mix together two parts pure linseed oil and one part good brown japan; to each gallon of this mixture add 1 pint of turpentine. Mix well and allow to stand for half an hour, then add sufficient pure ground silex to make a dough about as stiff as soft putty. Allow this to stand for twenty-four hours before using, then thin the required quantity with turpentine. The extent to which it is reduced must depend on the condition of the part to be filled—the worse the pits the heavier the filler.

This filler will also answer for filling wood, and is used as recommended for metal; in fact, as a wood filler it has no superior. It should be brushed well into the pores, and should be used sufficiently heavy to thoroughly fill them. Allow it to dry until it becomes flat, then remove the surplus with excelsior.



Dry goods salesman's sample car, with side doors closed. The body is of wood framework, covered with steel panels, painted gray and lettered in gold. There is a space for spare tires at the bottom in rear of body.



The same body as above, with doors open to show racks and shelving on which samples of dry goods are carried. Five of these cars have been sold to a Middle West wholesale dry goods house.

DRY GOODS SALESMAN'S SAMPLE CAR, BUILT BY THE ARMSTRONG JOHNSTON MFG. CO., COLUMBUS, OHIO.

Rubber Tires on Trailers

A new ordinance in New Orleans requires rubber tires on all motor trucks and trailers. When this ordinance was introduced more than three months ago, there was considerable opposition to it by draymen, but they agreed that if time were given them to experiment to determine the best equipment to buy they would withdraw opposition. No protests were made when the measure was called up recently for action.

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The Vehicle Monthly Course in Drafting and Construction

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Part E——Lesson 27. Straight and Convex-Concave Turn-Unders

(Continued from pages 34 and 35, August, 1919, of "The Vehicle Monthly.") (For description see page 35.)

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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Heergeist, Technical Editor and Draftsman of "The Vehicle Monthly."

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Subjects Treated in Previous Numbers

Part E—Lesson 1—Laying Out a Plain Board Seat
" — " 2—Framing a Four-Cornered Seat
" — " 3—Framing a Round-Cornered Seat
" — " 4—Laying Out and Framing a Two-Passenger Seat
" — " 5—Laying Out and Framing a Twin Seat
" — " 6—Constructing Round Cornered Seats with Stripe and Boards
" — " 7—Constructing Round Cornered Seats with Horizontal Joints
" — " 8—The Laying Out of Proportional Corner Curves
" — " 9—Establishing the Concave Surfaces of Seat
" — " 10—Length and Shape of Concave-Convex Seat Strainers
" — " 11—Length of Spindles on a Round Cornered Seat
" — " 12—Lengths of Seat, Spindles and Position of Rails
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" — " 20—Obtaining Lengths, Heights and Curves by Triangulation
" — " 21—The Creation of Bottom Curve, Length of Spindles and Position of Rails on Bottom View, by Intersections
" — " 22—Diagram of a Round Cornered Seat
" — " 23—Obtaining Lengths, Widths and Shapes of Seat Panels
" — " 24—Obtaining Curves of Seat Panels Direct from Bottom View
" — " 25—The Concentration of Diagrams
" — " 26—Obtaining Shape of Panel on High-Back Seat

BACK NUMBERS CAN BE HAD FROM THE PUBLISHERS.

Part E——Lesson 27
Straight and Convex-Concave Turn-Unders

(For Working Draft see page 34.)

EXPLANATION. Fig. 27. On this diagram there are two different turn-unders. On the left of center line is the straight turn-under, and on the right of center line is the concave-convex turn-under. The two kinds are shown together so as to make a comparison of them on the same diagram, illustrating their differences as to the width of seat and the positions of the spindles.

The construction of the diagram is similar to others, except that the seat has a curved rail in one piece. The diagram shows how to establish the lines for it, so as to fit the curve on side and back elevations for either straight or concave turn-under; also showing the different inclinations on each sectional line on seat frame and rail, representing the outside surface of seat and rail, but not the position of spindles, as shown in Lesson 16, on which the center of spindles is moved inward. A, B, C, D, E, also the numbers from 1 to 24 in the three elevations and bottom view, corresponding each with the same number and letter, saves considerable explanation, because the figures always show the position of each sectional line and the letters the position of the diagonal line on bottom view, from which they start into back and side elevations.

On this diagram are four separate sections. Section F represents half of back elevation, from center line to inclined line C D, on which the turn-under is straight.

Section G represents the side elevation from inclined line C D, to front end, in a vertical direction with the base line, on which the turn-under is straight.

Section H represents half of back elevation from center line to inclined line C D, on which the turn-under is convex-concave.

Section K represents the side elevation from inclined line C D, to front end in a vertical direction with base line, on which the turn-under is convex-concave.

These sections give the desired results direct, when the inclinations have been established, as done in practice. To obtain the length on each point, each division is squared over directly into the sections of the inclined lines, either from side elevations or back elevation. To establish section F proceed as follows: Draw horizontals from points A and B, center line, on back elevation, into section F. Draw vertical line from A to point D B. Take space, bottom view, from point C on top rail curve, intersecting with diagonal to point D.

Carry this space over to section F, from point C to A and make vertical from point C, down to base of back elevation. Take space on points A B, center line, on bottom view, and carry this space over to section F, from vertical point A B to A. Connect point A with point B and point B with point C. The three points between C and A represent points 1, 3 and 5, and these also are taken from bottom view from points 1 to 2, 3 to 4, 5 to 6, and carried over on line A C, section F, between C A. From these points 1, 3, 5 connect with points D B. Square points 1, 3, 5 and E over from back elevation to section F on which the points are made. Take lengths from point D B, to points A 1, 3, 5 and C, which are the correct lengths.

The same rule is employed for side elevation, section G. Carry base line and upper top edge of side elevation into section G. Draw horizontal C, square with base line of side elevation. Take space from point C to point D, bottom view, same space as from A to C, section F, and place it from point D to C. Take space from point 15 to point 16, bottom view, and carry it into section G, from point D to point 15. Connect point C and point 15 with point D, base of side elevation. Take space between points 7 to 8, bottom view, carry it over to line C D, section G, from point D to point 7; connect point 7 with point D. Points 7 to 8, 9 to 10, 11 to 12, 13 to 14, 15 to 16, bottom view, are taken the same way. Square points from upper edge of side quarter E, 7, 9, 11 and 13 into section G, on which the points are made and on which are all the correct lengths for each division on side elevation from C D, to the square line on points 15 and 16. The convex-concave turn-under is taken the same way. Deduct the amount of turn-under for both the straight and convex-concave turn-under on bottom view, both for top rail and seat frame, for which all the lines are made, and find them by deducting the amounts of turn-unders.

PROBLEM. Fig. 27. Draw a complete diagram for each. One with the straight turn-under and another with the convex-concave turn-under. Also cut a block and use a paper pattern for straight turn-under to compare with diagram.

PART E—LESSON 28 WILL APPEAR IN THE OCTOBER NUMBER OF "THE VEHICLE MONTHLY"

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Painting and Finishing

Oils and Thinners for Truck Work

By M. C. HILLICK

In truck work it is desirable to have the maximum elasticity as a means of successfully meeting the vibration and surface strains imposed upon this class of equipment.

It has for generations been recognized that for the purpose of developing this elasticity raw linseed oil is without a superior, and accordingly the painter has been strongly prejudiced in its favor.

Linseed oil, while a highly elastic medium, is nevertheless a drying oil. In this class may be included poppy seed oil, nut oil, China wood oil (largely employed in the making of reinforced linseed oil, combination oils, and varnishes) and sunflower seed oil. Corn oil and cotton seed oil are sometimes included in these lists of drying oils, but they are only partially drying, and strictly belong to the semi-drying oils.

The drying oils are endowed with the property of absorbing oxygen and forming a tough, elastic substance or coating. With the bare exception of China wood oil they dry from the surface inward. China wood oil, it appears, sets simultaneously from top to bottom, after the manner of cement.

Metallic oxides added to these oils by heat or otherwise, by acting in the capacity of carriers of oxygen, hasten the drying process. Upon exposure the hardening process goes on slowly until the prime of life has been passed, after which disintegration sets in and the medium decays.

In the field of thinners, turpentine still holds the center of the stage, figuratively. It is at once recognized as the thinner without a rival, although numerous would-be rivals have clamored for recognition. Turpentine is distilled from the sap of pine trees. The residue derived from the process of distillation is known as rosin. The wood turpentine, of which we hear much during these later years, is derived from pine stumps and roots of the pine tree. It is the next best thinner to the turpentine distilled from the pine tree sap.

Benzine, a so-called paint and color thinner, is the product or distillate from crude petroleum with a gravity of from 60 to 72 degrees by the hydrometer. The lighter forms of the crude petroleum are represented by gasoline of various degrees of gravity. The heavier forms of the petroleum are known as fuel oils, lubricating oils, etc.

Among the advantages of turpentine, in contrast with benzine, is its slower process of evaporation, and the fact that it cannot all be recovered from the pigment, as in the case of benzine, has resulted in the belief that it leaves some form of substance in the paint or color film. Being also at least a slightly oxidizing body, it is likewise thought to have a drying action on the pigment in which it is used.

Benzine, through the process of distillation, can be practically all recovered from the paint in which it is used. In evaporating it leaves no residue behind and on the coarser paints it is supposed to have no injurious effect; on the fine colors the effect is such that experienced painters choose to leave it severely alone as a thinning medium. It gives a fine color a gritty or sandy condition on the film, after drying; its rapid evaporation prevents the smooth and uniform application of color in which it is used to the surface.

It is not worth while to adulterate benzine, but turpentine is variously contaminated and extended through the addition of heavy forms of petroleum.

The wood or stump turpentine, in contrast to the sap turpentine, varies greatly in quality even when made under the most careful regulations, although experts confess that the better grades compare most favorably with the sap product.

The truck painter has reason to be jealous of the quality of the thinners and oils that he uses, for to a large extent they come to the very heart of the matter of durability and good appearance of the work. If the oil is obtained of any good, reliable seed crusher it is fair to assume that a pure and thoroughly reliable product will be had. However, if the oil is for any reason suspected it may be tested through the application of a few simple tests.

Putty Practice

With the advent of the steel and aluminum automobile body the vehicle painter commenced thanking his lucky stars that his troubles from the use of putty were at an end; that henceforth putty problems were to be only a memory. However, none of these delightful dreams came true, because the use of putty must continue, and the plans of making the plastic pigment serve the maximum purposes at the outlay of the minimum quantity of material must continue to be studied and worked out.

Metal surfaces have a habit of rusting, of becoming dented, of developing cavities which good painting practice suggests must be filled and eliminated. The old paint fabric also has the habit of getting broken and chipped out and slivered; it likewise becomes in the course of time checked and fissured, in which state it must have the treatment which only the ever-ready and helpful putty affords. Again we find putty indispensable. Hence, it is manifest, in the face of all opposition, that putty is a pigment that in vehicle painting must be reckoned with and made use of.

As in the domain of paints and painters, there is in the making of putty both good and poor. With the latter we should have no patience; it has no place in the economy of painting. Only the former merits our attention. After providing the proper raw materials—the good and worthy kind—it is the supremely careful and skillful work that should be employed in the making of it; in fact, here all the quality becomes established—the smooth, fine, flexible, responsive, close-sticking, sure-drying, splendidly-surfacing putty.

How many batches of putty are spoiled through careless methods of making; boy work, or incompetent man work, as you please! The vital fact should be amply impressed upon the maker of putty that it is one of the most important mediums used in the painting of vehicles; that its use is, if anything, more important than some of the coats of material, so called, the very life of the finish.

Perhaps through a more comprehensive understanding of the real value of putty in the development of the finish the average painter may be taught the better way of making it.

At all events, all the component parts of putty need the most thorough incorporation; the most careful and complete kneading and welding, the refinement and smoothing out of the various ingredients, the uniform manipulation of every particle of pigment. With this accomplished, the resulting material should have a suppleness and a smoothness of texture so complete and uniformly and thoroughly developed that the man who putties can have no excuse for inferior work.

The reader has doubtless seen the putty from which minute particles of pigment have kept breaking and rolling out as the putty has been spread over the surface defect; when this happens it becomes necessary, as even the layman will at once understand, to re-putty the blemish, for the reason that the face of the plaster of putty contains little holes which if permitted to remain will at the finish become exaggerated and look bigger and uglier than at the beginning.

This defect of the putty is due to insufficient working and kneading of the putty in the making. That is, the dry pigment has not, in the first place, been wet up with the fluid ingredients, and in the second place, the lack of thorough manipulation of the pigment has failed to moisten and mash these dry atoms. Thus scattered throughout the putty they cause it to yield disastrous results.

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The formulas for making putty are in number fairly as the stars at midnight, but after all the vehicle painter has actual need of but few. Probably the old time formula employed by the carriage painter for many years will serve the needs of the present-day vehicle painter most fully.

This formula consists of one part of bolted whiting, or one part of whiting known as Paris white (the top layer of whiting in the settling tank) and two parts of dry white lead, finely ground. Mix in equal parts of coach japan and rubbing varnish.

For a putty desired to dry to a very hard face and to be rubbed down with artificial rubbing stone, use dry white lead and equal parts of quick, hard-drying rubber varnish and coach japan. For the majority of cases, however, the first-named formula will suffice and give high grade results.

A slower and perhaps a tougher textured putty is made of three parts dry white lead and one part keg, oil-ground lead; equal parts of rubber varnish and coach japan for the liquid ingredients. This cannot well be sandpapered.

For use in setting glass in heavy window sash is recommended a putty made of two parts dry white lead and one part keg, oil-ground lead; equal parts of rubbing varnish and japan being used. Mix into this pigment during the making some fine plush scrap or pickings.

For draw puttying or glazing or facing-up purposes let some of the putty made by the first given formula down with turpentine to a consistency freely workable from the blade of a wide scraping knife. This latter work will test the fineness of a putty. It requires a pigment of exceedingly fine composition.

Using Carmine

The automobile painter, now that the war is over, will have frequent occasion to employ carmine in his work to at least some extent. The question arises as to the best method of making use of the glorious color. This depends largely upon where he is to use it. If upon the running parts, or for the wheels alone, as you may often see the color used, the practice of using the pigment may be quite radically different from the plan of handling it upon the car body surface with its wider and more expansive exposure.

In either case, or in all cases, it is highly essential, in the first place, to provide a most excellent ground or basic color over which to cast the carmine.

Despite the fact that carmine is one of the lighter toned colors with the apparent capacity of deceiving the eye with respect to the extent of surface defects, it will need some of the best and most thorough surfacing processes provided by the skill of the experienced painter. With this necessity in mind it is well to start at the beginning and dress the surface up in sufficient finery to make it about as smooth and level as work may be made. This applies to either new or old work; just keep the need in mind of getting results clean, fine, smooth and as level as possible. That will serve as the working principle.

Having secured the desired surface refinement in detail, we have next the first coat of ground pigment. Perhaps a very light carmine, as for the wheels, is desired. Coat the surface up, to begin with, with a color made of Indian red and flake white, or any good japan ground white.

Add the red to the white until a peachblow color appears. Thin with turpentine to the right consistency, and apply with a camel's hair brush. Lay the color clean and smooth and in due time apply a coat of English or American vermilion, finely ground.

Time was when the English vermilion excluded the American article from the field, practically, but this condition exists no longer, for it is possible to procure a very fine vermilion in this country at a moderate price.

Break the vermilion carefully up in turpentine and then add varnish—never oil. The latter will somehow ruin the tone of the vermilion an dunfit it even for a ground color. One coat of this vermilion for small surfaces should provide a ground solid enough to take good care of the carmine. It is the more advisable way to procure the carmine in collapsible tubes, ground in japan.

In adding rubbing varnish to the vermilion, it should be said that only enough of the varnish will be required to give the color a slight lustre, like an eggshell gloss, and bind the color in place. This will also help the working property of the pigment.

In reducing the carmine for working, first let it down gently with turpentine; add just enough to permit the varnish to strike through the color at once and completely. Then add the varnish gradually, using a medium quick drying rubbing, and stir until a very thorough mixture is obtained with all desirable working properties incorporated. An ounce of color to a pint of varnish are the proportions which will yield good results.

In applying the carmine use a badger hair brush—a flat 1½ inch one for wheels or running parts—and flow on all the surface will take care of in perfect shape. If for any reason the surface should fail to show solid covering qualities it will be necessary to apply a second coat of the glaze color, but before doing this it will be in order to reduce the gloss and fit the surface by rubbing lightly with a fleece wool sponge dipped, after moistening with water, in pumice stone flour.

Simply break down the sharp lustre and smooth away any possible dirt drift which may have lodged in the glaze coat before it got out of the setting stage. Use the glaze in the same condition it was used for the first coat. This should suffice to establish the proper solidity of color.

For the next coat, which will pass as a varnish coat, let in a little of this glaze with the rubbing varnish to preserve the purity of the carmine, and continue this until next to the last coat of rubbing varnish, provided any lining work is to go on; this should have one coat of rubbing varnish over it. In case no lining work is to go on, it will be approved practice to carry a bit of the color right along in all the rubbing varnish coats. This will insure a finish of deeper and more brilliant color effects.

For the car body panel work where a deeper toned color is desirable, a Tuscan red ground may be used to advantage; if a little more flame is wished, add a little vermilion, and if greater depth is advisable, add some refined Indian red. Then reduce some carmine with turpentine and with a camel's hair brush of a size suitable to the size of the surface apply a coat of the color as a flat coat.

When dry, coat with the carmine varnish-color or glaze after the manner above stated, using a brush of a size suitable to the size of the surface in order to develop correct flowing conditions. Remember, you cannot very well over-refine carmine.

Developing Durability

This is one of the main factors which the vehicle painter is expected rightly enough to establish as he proceeds with the process of painting: many other things, to be sure, are coming along for attention, all of which are more or less important, but lacking durability all else counts but little.

Much uncertainty in the very nature of the circumstances must exist in connection with the repainting business, for at the best it is a constant struggle with adverse conditions. The work in large part is performed over old paint and varnish fabrics concerning the nature of which the painter actually knows but little; upon the face of the finish a good gloss may be shining, or if the gloss has in large part disappeared the surface film may show firm and intact, and to all intents and purposes perfectly capable of doing valiant service.

At the same time certain chemical reactions may be under way, or a complete breaking down of the old finish from the under part of the surface may be actively in force without any visible outward manifestations, any or all of which are of sufficient power to absolutely undermine both the old and new finish.

Then the question of durable material is always foremost, and while the supplies furnished by reliable manufacturers yield the only safe means of producing durable work, other things being equal, even the best materials are sometimes subject to such abuse by the car or vehicle owner that they may prematurely break down under the imposed strain. When this occurs the damage is at once laid at the door of the painter for adequate explanation or redress.

It is plain, therefore, that durability is a state concerning which the most experienced painter can really promise little previous to the trial of his work. Nature, chemistry, the "flesh and the devil" at times all conspire to his undoing; it is only by persistently striving to make his every effort count for the best grade of results that he may have reason to hope for at least a good average of satisfactory work.

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Upholstery, Toppings and Mountings

The Art of Motor Car Trimming

It has been truly said that the automobile or carriage trimmer must "quilt like an upholsterer, stitch like a harness maker, and sew like a tailor." It is just as necessary that he should have good taste and a knowledge of design, proportion and color. The materials he uses are among the most costly of those employed in the factory and require great care in storage and in working, to avoid waste. So there is a great deal for the young automobile trimmer to learn before he can consider himself an expert.

Mr. Newcomb's series of articles, now running in "The Vehicle Monthly," are intended to cover the whole subject of automobile upholstering. He has taken up the art at the beginning, and as the series proceeds will impart to his readers many useful hints and helps, as valuable to most journeymen as to the average apprentice. The series will conclude with the selection of several typical cars, for which Mr. Newcomb will furnish complete trim instruction from the start to finish.

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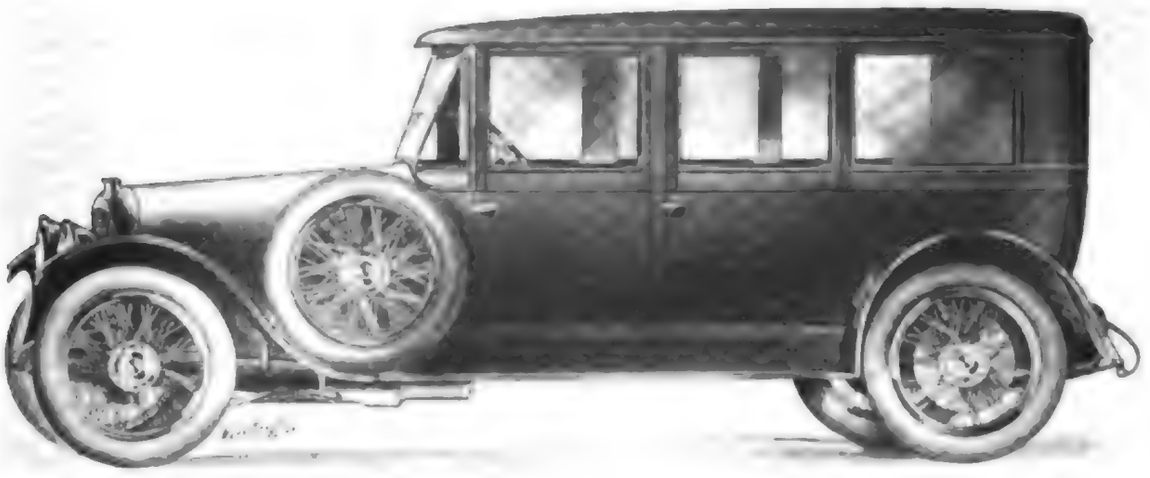
Sedan Body Upholstered in Leather Substitute

By JOSEPH A. NEWCOMB

The sedan body is rapidly advancing to the point of becoming the most popular all year family and business car. Its many advantages over other types, particularly where there is but one car in the family, are rapidly being recognized.

The fact that they are so much cleaner for touring appeals to every one. The ease with which the glass may be lowered or raised permits proper ventilation and makes the sedan comfortable for all kinds of weather, hot, cold or inclement.

When new and on the sales floor, or when used only on special occasions I realize that cloth has a far richer appearance than leather or its substitute, but due to the fact that the sedan gets the hard everyday grind, I believe that ultimately leather and its substitutes as well as cloth, will be used extensively in upholstering sedans. For that reason I shall take this opportunity to describe the upholstering of a sedan with a leather substitute.



For hard, every day use a Sedan of this type may very well be upholstered in a combination of cloth and substitute leather. The body shown is by Jas. Cunningham, Son & Co., Rochester, N. Y.

Characteristics of the Sedan Body

The sedan is undoubtedly the most sociable type of body built for five passengers or more. It is with a well-satisfied feeling that an owner will drive a sedan without in any way feeling a lowering of rank or isolation from the rest of the party. Yet it affords all the conveniences and luxuriousness of any other type of closed body.

One of the peculiar features, however, of the popular-priced sedan, is the fact that they are all almost universally trimmed in cloth. For hard, everyday use, touring, business and family rides, cloth, while pleasing to the eye, is too delicate. It soils easily and is hard to clean, and it depreciates faster than the car itself. For that reason, I believe a strict adherence to cloth is a detriment to the still larger sale and popularity of the sedan.

Combinations of Cloth and Leather Substitute

Many combinations as to colors are possible when using leather substitutes, since they are made in various beautiful colors and shades. Darker colors may be used below the belt line and lighter ones above, giving the same duotone effect as secured with cloth.

Spanish leather substitutes may be used in combination with a plain color and a combination of cloth and leather substitute is also possible. Using the leather substitute below the belt makes a very attractive and serviceable job. The ease with which leather substitutes may be cleaned and the service they render, surely make them a very good upholstering material for popular-priced cars.

One tremendous advantage that a sedan body has over a touring car is that, due to construction and design, comfort is more easily secured in upholstering a sedan than a touring car. The reason for this is that we are able to use a higher cushion without making the passengers look and feel that they are sitting on top of the car. Then, again, we are able to use a much higher back, thus affording a real back support and rest. With these two points of advantage the trimmer is certainly to blame if a comfortable, fine-appearing seat is not secured.

The trimming of a sedan can be done far neater and cleaned than a touring car for the reason that more liberty can be taken in the way of securing a well-proportioned line, whereas in a touring car the shape of the body limits absolutely the shape of the trimming. Thus a maximum degree of comfort and beauty can be attained in upholstering a sedan body.

A Suggested Color Scheme

As a color scheme combination I would suggest a gray Spanish leather and a blue gray cloth above the belt, and in treating the trimming thereof I propose to aim at economy throughout, using the minimum in materials and reducing the labor to a minimum, using a method by which every operation will count where time and method is considered economy, using up-to-date "system" in order to

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reduce the quantities and costs of materials needed.

French Plaits for Backs and Cushions

The body will be trimmed perfectly plain, using the French plait type of upholstery on backs and cushions only. The rest of the job will be absolutely plain. Horse hair carpet is used for floor cover. All the cloth to be used is head lining cloth. Where a finish is required it will be secured with seaming and pasting lace.

The Question of Cost

In preparation for latter-day upholstery, cost of production is a big item and must receive the first consideration. The design to be used must first be considered and lined up to meet the cost estimated. Methods must be adopted that will consume the least possible amount of labor so that there be no lost motion and the least possible amount of operations provided for. Preparation must be made for the use of a minimum amount of materials. Methods must be adopted that will simplify all operations. Simplicity of workmanship in order that the use of an all-round skilled mechanic can be dispensed with. Or, in other words, preparation may be made and systems adopted in order that the shortage of labor can be to a degree minimized.

I am using the above explanation with the forethought of the future in mind. The above statement need not be confined to production work, but should be applied to all automobile upholstering shops, at least to some degree.

Concerning the Springs

In preparing to upholster the sedan body we are about to treat of, the spring construction for the backs and cushions are first considered. The gauge wire to be used is governed by the height of the spring to be used. The higher the spring the lighter the gauge. The front or driver's spring should be a gauge heavier than the rear spring, or if a 13-gauge wire is used in the rear a 12-gauge should be used in the front with the outer row of springs of 11- and 12-gauge, 11 in the front row and 12 in the rear. The reason for the heavier gauge coil in the front is on account of the more severe service to which it is subjected. The spring used is of the ready-manufactured lace web type. Proper spring arrangement minimizes the quantity of hair necessary; in fact certain types of springs eliminate almost entirely the use of hair.

In arriving at the shape and height of spring for cushions the following rule is used: First, the finished cushion should not measure over 15 inches in height from the floor, a pitch of 3 inches gives a comfortable riding position. In getting the shape and size of the spring a piece of paper or other suitable material may be used, which is laid on the seat board, marked around the tacking strips. Three-quarters of an inch is allowed at the rear, ⅛ of an inch on each side, where plain quarters are used, and ¼ inch at the front. This usually furnishes sufficient room for all trimming allowances and makes a snug, neat fit, and there will be no shifting in the cushion. From this pattern the cushion spring is made and also the wood framing to which the spring is attached.

The size of back springs is arrived at by measuring the space which we are allowed from the front of the seat frame, placing a square up at this line and taking the measurement to the extreme of the wood frame. This space we find would allow of an 8-inch spring at the full of the back, and in order to shape the back the size can be reduced toward the top and bottom. The width of the spring is arrived at by placing the outer row of springs ¾ of an inch from the lining board and filling in the space across.

The shape having been ascertained, measurements taken, and marked on the pattern, the spring-maker completes his construction from the pattern given and 15 gauge wire is used. The reason for mentioning springs first is because of the fact that they must receive the first consideration, and patterns should be taken as soon as the body is far enough progressed to permit of taking the measurement in the wood shop.

Making the Cushions and Backs

The backs and cushions requiring the largest cuttings of materials are laid out first. In this class of work patterns and work are executed as follows: The entire cushion spring is covered with duck of a substantial weight, say 8 or 10 ounces and backed on the edge of the wood frame to which the spring is attached, over which is covered a layer of interlaced hair projecting slightly over the spring edge and sewed fast to the duck covering with sewing twine, using a curved needle. Over this stretch a piece of heavy unbleached muslin; mark around the spring edge at the top and the bottom of the wood frame; allowing enough for tacking underneath; remove the pattern; mark the center. Allow from your outer mark 5 inches for the first plait line and space off as near 4 inches as possible in equal divisions. The plaits run from the wood frame, front and back. This completes the foundation pattern for a one-piece covering of the cushion spring. This is intended to cover the cushion entirely, or in other words, creates the facing.

The Fullness Pattern

The fullness pattern is made by using the foundation pattern and enlarging the amount of fullness required, ½ inch and ⅝ inch being the amount of fullness required. The fullness pattern is used for cutting the material to be used.

(Continued on page 47)



A Sedan Body (Owen Magnetic) for which substitute leather upholstery would be suitable.

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O'Bannon Coated Fabrics for Truck Curtains

When making curtains for truck cabs, the trimmer must bear in mind that the driver of a truck carries a big load of responsibility on his shoulders. A truck loaded to its capacity of from one to five tons, moving along at a speed of from eight to twenty miles per hour, has considerable momentum and must at all times be under the control of the driver in order that loss of property through collisions may be avoided and that the loss of life or injury may not result.

In order to assist in the "safety first" propaganda the driver of the truck should be properly cared for. His seat must be comfortable, yet not tend toward laziness. His storm curtains must afford real protection and the vision lights must be so arranged and of such a size that the driver can properly see both to his right and to his left. The point of road vision must be properly studied by the designer of curtains and windshields for trucks.

Use large vision lights and properly reinforce them. Make the curtains fit snugly so as to afford real protection, but don't make them so complicated that a book of instructions is necessary to put them in place. Don't be afraid to use a big hem on truck curtains and make it a double reinforced hem. They will have to do heavy duty, so prepare for it. O'Bannon makes a most suitable material for this purpose. It is waterproof and is tough and durable.

When making curtains for the sides and rear of express bodies, arrange to hang the curtains on the inside of the top rails for the reason that it makes a much tighter job than if on the outside, even if placed under a moulding. Reinforce them at all points of contact with the body and sew in at least an 8-inch double reinforced hem at the bottom. I find that the better way to fasten these curtains is to sew a strap to the curtain and rivet thereon a buckle, place a footman loop on the side of the body and draw strap through it and buckle. This makes a positive fastening and permits adjusting. O'Bannon's is a magnificent, durable material for such curtains.

Seat and Back for a Truck

When upholstering a back for a truck seat, whether a lazy back, ordinary truck seat or cab, use some springs wherever possible, and be sure to support the middle of the human back. Trucks are compelled to make long trips, over all kinds of roads and under all conditions, and nothing will develop carelessness faster than a poor back rest.

In building the cushions, use good, soft springs and cover them well with hair, cotton or whatever filling is specified, but cover them sufficiently so that the coil will not be felt. Use a good leather substitute for the upholstering material. O'Bannon's R. L. Grain, Black, Medium Bright Finish, 50" Moleskin Quality has proven a most satisfactory material for truck work.

The springs used in cushions for trucks must necessarily be made of a heavier gauge wire than those used in passenger cars. This can easily be understood because of the difference in spring construction and tires on the chassis.

O'BANNON FABRICS O'BANNON CORPORATION

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OF O'BA
O'BANNON FABRICS

A substantial truck cushion is made in the following manner: A wood frame is provided 2 inches high, ⅞ inch thick, well secured and fastened at the corners, allowing sufficient space for the trimming material used so that the finished cushion will fit "free." Strip springs are attached to



this in numbers according to the length of the cushion. The base of these strip springs being made in the shape of a U, with a lip on each end which rests on the top of the wood frame, fastened to the frame with two screws in each end. The base of the strip drops about 1½ inch below the top of the frame and the cone-shaped coil springs being about 4 inches high, make them extend about 2½ inches above the frame. These coils are then tied together by the upholsterer's usual method. This is then covered with a No. 8 sail duck tacked on the face of the frame, over which is laid a heavy layer of interlaced hair sewed fast to the duck; a sheet of cotton is laid over the hair, and O'Bannon's R. L. Grain, Black, Medium Bright Finish, 50" Moleskin Quality is drawn tightly over this and tacked around the face of the frame. A facing of the same material is then blind-tacked and turned even with the top edge of the wood frame, and tacked underneath on the bottom as a finish.

A cushion made in this manner with the materials mentioned gives mighty good results for the class of work for which it is intended.

Get Acquainted with the Whole Line

When using upholstering materials it is well to know that manufacturers of upholstering materials make them for various purposes. It is not just a question of making a body material or a top material, but there is a special material for every purpose. Particularly is this true of the O'Bannon line. In leather substitutes for body trimming there are various grades, made in numerous colors and finishes. This is also true of top materials.

Then there are the cab top materials, sedan and limousine roof coverings, special grades for linings and pasted work, also for gimps and laces. Then again there are the enameled ducks and drills. It is essential that the up-to-date body manufacturer takes advantage of these various materials, not alone because of the saving in money, but because they are better adapted for their specific uses.

Spanish Leather Substitute

The colored Spanish leather substitutes are finding quite a demand for the trimming of touring cars, front seats, driving compartments and cowls of sedans and limousines. It is particularly well adapted to this work and presents an effective appearance. It can be had to match in color the cloth used on the inside or the paint of the body.

Your customers have been taught what to expect in a top—save arguments and trouble—use Duxrane, the proven and tested top material.

200 FIFTH AVE. NEW YORK
O'BANNON FABRICS

O'BANNON COATED FABRICS

FOR THE OUTSIDE OF THE CAR

RUBBERIZED TOP FABRICS

ENAMELED GOODS Muslins-Drills-Ducks



200 Fifth Ave. O'BANNON CORPORATION NEW YORK

Send for samples of our complete line

O'BANNON FABRICS

The back patterns are arrived at in a like manner with this difference: The back springs are placed in position in the job and covered with interlaced hair, the hair extending from the top where finish is to be placed, extending down to just below where the top of the finished cushion will meet the back and enough allowed on the sides to turn in around the spring edge.

The outer covering is tacked at the top and at the bottom at the tacking strip, and enough material allowed at the sides to turn in. The finish at the bottom of the back is accomplished by a drill leather substitute lace, likewise the cushion at the bottom.

The side quarters are trimmed plain. Two layers of glazed cotton wadding are sufficient for a padding. Tacking is finished under the window molding, tacking on the seat board, the rear pillar and at the front of the hinge pillar. All below the belt line is trimmed with a substitute leather. No arm rests are provided as the quarters are plain.

The rear of the front back is padded with two layers of glazed cotton wadding and covered with leather substitute tacked on the top of the back framing, on the floor board and along the lock pillar.

A robe rail is provided on the rear of the front back, which consists of rings and plates at the ends and a rope center covered with leather substitute.

The Cowl Trimming

The cowl pads are fitted where intended, to which is cemented the leather substitute covering, turned and stitched an dtacked in place with the use of gimp tacks. The cowl facing is trimmed plain with the use of cardboard to which the goods is cemented and tacked in place with the use of gimp tacks.

The floor covering is horse hair carpet, bound with a round binding of the same material, but not lined, and is held in position by regular carpet fasteners.

The pillars above the belt line are covered with cloth, which is lined with one layer of cotton wadding.

Upper Rear Quarters and Head Lining

The upper rear quarters are first enclosed with buckram, covered with two layers of ¼-inch cotton wadding and covered with cloth which is finished under the window moldings. The head lining is fitted and attached to one tacking strip at the front, and a dome light is provided which takes the place of a tacking strip at the rear.

In tacking in a head lining, especially if striped goods are used ,the cloth should be stretched tightly front and back and evenly along the side eave rails. Enough tacks should be used to keep the lines straight.

Wind Breaks

Wind breaks should be provided at both lock and hinge pillars. Wind brakes are made by folding a piece of leather substitute below the belt line, and leather substitute for the back and cloth at the inside above the belt line, since the body above the belt line is trimmed with cloth and below the belt line with leather substitute.

The doors are trimmed in cloth by blind tacking the outer edges and turning the cloth under, with moldings for a finish.

Below the belt line substitute leather is used; one-eighth of an inch from the outer edge, sides and bottom a 1-inch half-round tacking strip is placed; two layers of cotton wadding are then covered with the goods and tacked at the finishing points, sides and bottom, and finished under window moldings.

All laces, cords and welts are made of the same material, using a strip two and three-eighths inches wide made into a combination cord welt and stitched on both sides of the section that creates the flat welt.

Amount of Material Required

The amount of goods required is nine yards of leather substitute, three and two-thirds of head lining. In figuring the amount of material to be used, it is arrived at by cutting patterns for each particular part, eliminating all waste and arranging patterns on goods *before cutting*. If this method is followed it is surprising how little waste there is and the small quantity of goods required to cut a job. If all cloth were used, the total quantity amounts to a trifle over eleven yards.



A Type of Body for which the Upholstering described in the accompanying article would also be suitable. Built by The Paige-Detroit Motor Car Co., Detroit, Mich.

An "All-Round" Top Material

The Du Pont Fabrikoid Company, Wilmington, Del., knowing that it could make and sell a reliable rubber top material in quantities so great as to effect large savings and thus make possible a low price, has brought out Luxar.

Luxar is stylish, rich appearing and in every way suitable for making trim, smart tops. Actual service will prove it to be exceedingly tough, durable and long lived—a material that preserves its attractive appearance and gives protection through seasons of hard wear.

The material is made in both single texture and double texture for tops and in a comparable single texture for curtains. In every type the fabric base is of sufficient weight and strength and the coating of ample thickness and quality to render Luxar proof against all weathers and very durable.

Luxar is furnished 54 inches wide for tops, 54 inches and 36 inches wide for curtains. It can be supplied for both purposes with either black, drab, or whipcord back. Rolls contain approximately fifty yards. This top material is guaranteed for one year from date of shipment against leaking, cracking, peeling, blistering or blooming.

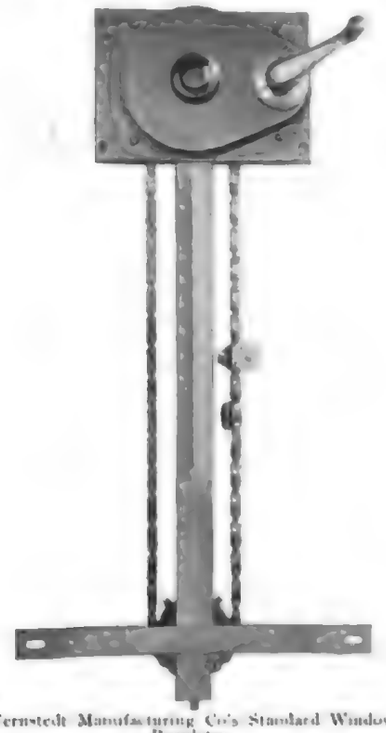
A descriptive circular, with a sample of Luxar, will be sent to any of our readers who apply for them, addressing Du Pont Fabrikoid Co., Wilmington, Del.

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Something Good in Window Regulators

The Ternstedt Manufacturing Co., Artillery and Muster Avenues, Detroit, Mich., are offering a line of window regulators that certainly appeal to all practical body builders.

The Ternstedt window regulator is very

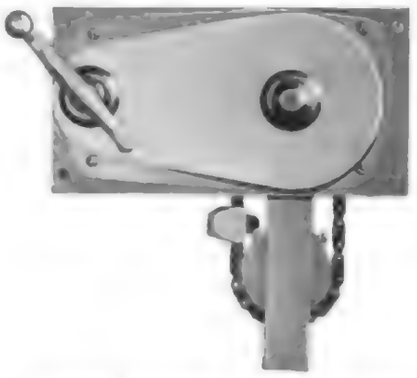


Ternstedt Manufacturing Co's Standard Window Regulator.

simple in construction, and any body builder who has seen some of the complicated mechanism in certain devices of this kind, will realize at once that simplicity of design is a big point in its favor.

Installation is also a very easy and simple operation. The body maker has simply to bore six holes through which to bolt the regulator to the door. The regulator is provided with a cone clutch, which insures the regulator locking in any position in which the handle is stopped. There is a full-floating bearing in the lower sprocket which assures the proper alignment of the chain, and which also takes up any discrepancy that may occur if, in the installation of the regulator it should not be exactly aligned. This bearing automatically aligns itself.

Another important feature is that if the glass is broken it is not necessary to take off the trimming in order to insert a new glass. By merely placing the regulator "on center" the sash can easily be lifted out and replaced. The Ternstedt regulators are made



Ternstedt Rear Quarter Window Regulator.

in any one-half inch measurements that customers may desire.

The Ternstedt Manufacturing Co. has just moved into a new factory building, which covers 60,000 square feet of floor space, equipped, of course, with the latest and best machinery.

The company has a very large press equipment and has thoroughly provided its factory with all modern labor-saving devices. The plant is complete and up-to-date in every way.

At the present time the company is turning out between 800 and 1,000 window regulators each working day, but this does not by any means represent the total production. Curtain rollers, anti-rattlers, for the sash and windshield wipers are also made in large quantities. A number of specialties in closed body hardware are also features of the Ternstedt lines.

The concern has been manufacturing window regulators for the last three years, but until this year has never had sufficient plant capacity to take care of additional customers. Now, with the new factory in steady operation, body builders everywhere are invited to get in touch with the Ternstedt Manufacturing Co., Artillery and Muster Avenues, Detroit. Those who know most about other types of window regulators will be in the best position to see that the Ternstedt device is something out of the ordinary when it comes to simplicity, ease of installation and operation and freedom from troubles of all kinds. Blue prints will be sent to body builders on application.

The "Clamp On" Metal Base

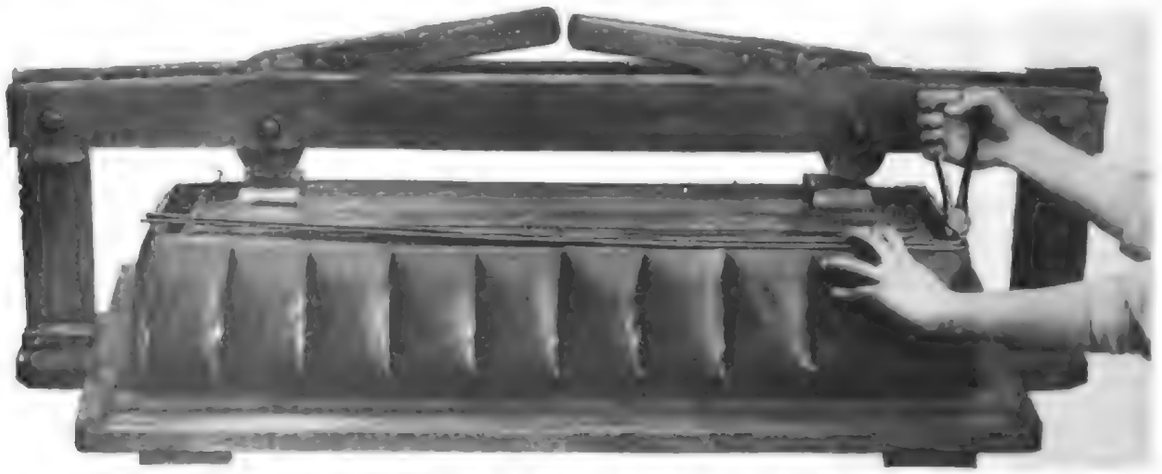
George L. Pederson, care Higgins Spring & Axle Co., Racine, Wis., is offering to body manufacturers a metal base, to be used in connection with cushions for passenger cars, trucks and tractors, or in fact for anything that requires a cushion.

Practically all cushion construction is with a wood base binding, but in the Pederson patent construction the corners are quickly and neatly folded in and clamped on to a base of metal.

The process is simple; no tacks are used; the leather or other material is merely brought over a flange and fastened as shown in the illustration. The only tool needed is a special pair of pliers. It is claimed the metal base cannot come off nor the material pull out. The necessity of stitching or sewing in a cord to bottom edge is entirely obviated. (See illustration below.)

This new invention will no doubt find its place in many trim departments and much benefit will probably be derived from it.

Cheap, flimsy top materials have gone the way of all their kind—"unwept, unhonored and unsung." The prevailing tendency today is to have the top worthy of the car. Body manufacturers know how much the top adds to or detracts from the appearance of a car, no matter how beautiful the lines or how lustrous the finish, if the top sags, creases or looks worn, the car cannot present a good appearance. Don't experiment—make sure by using a first-class material, such as Chase "Drednaut" motor topping, made by L. C. Chase & Co., Boston, Mass.



The "Clamp On" Metal Base, a feature of the Pederson process of cushion manufacture. The upholstery material is simply brought over a flange and fastened as shown in the illustration.

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News in the Trade

Martin-Parry Corporation

A new corporation for the manufacture and distribution of commercial automobile bodies has been formed, the Martin Truck & Body Corporation, York, Pa., and the Parry Manufacturing Co., Indianapolis, Ind., having effected a consolidation with the title Martin-Parry Corporation.

These two concerns started in business over thirty-five years ago and developed into large industries, the Martin Truck & Body Corporation becoming a large producer of horse-drawn vehicles in the East and the Parry Manufacturing Co. being one of the largest in the West.

With the increase in the use of commercial automobiles, both companies commenced manufacturing commercial automobile bodies. About three years ago, the Martin Company entirely discontinued the manufacture of horse-drawn vehicles and about a year ago the Parry Company turned its production almost exclusively to the manufacture of commercial automobile bodies.

The Martin plant, located at York, is well adapted as to buildings and equipment for supplying the Eastern territory and has excellent shipping facilities for the Eastern market, while the Parry factory, located at Indianapolis, is well equipped as to plant shipping facilities, etc., for the Western trade, these two plants thereby supplementing each other.

Economies in design and operation are now being perfected which will, it is believed, materially reduce the cost of production and also greatly increase the capacity of the plants. The two plants will have a capacity and working capital for the production of 60,000 bodies annually.

The appraisal of the properties recently made shows that the companies have real estate, plants, buildings, equipment and machinery valued in excess of $1,500,000, and net assets, together with the cash to be presently put into the treasury of the company, will amount to approximately $1,300,000, or total values in excess of $2,800,000.

To Make Steam Automobiles

The Amalgamated Machinery Corporation, 72 West Adams Street, Chicago, which won prominence during the war through the design and manufacture of shell-turning and gun-boring machinery, has focused its engineering capacity on the motor industry with the aim of demonstrating the advantages of steam as a motive power for passenger and industrial vehicles.

The company does not propose to launch a large production program until it has perfected a steam-driven automobile which merits a place at the head of existing designs of motor-driven cars. To this end a number of patents have been acquired and every effort will be exerted to supplement these with features which will make for maximum efficiency and endurance.

The first aim of the corporation is to make a high-class pleasure car. When it has done this to its own satisfaction, attention will be directed to the manufacture of other types of machines embodying the same principles of design.

The company is constructing a five-story addition, 90 x 300 ft., on the site of its plant at Thirty-seventh Street and Racine Avenue, Chicago.

Exhibitors at C. B. N. A. Convention

The following is a list of the firms and companies which have taken space at the exhibition to the held in connection with the C. B. N. A. Convention at Chicago, September 22 to 26. The exhibition, as well as the convention meetings, will be held in the Hotel La Salle. A considerable number of additional exhibitors will no doubt engage space before the opening of the exhibition, but at this date, August 20th, the names are:

Union Bow Co., Cleveland, Ohio.
Ware Bros. Company, Philadelphia, Pa.
Monarch Carriage Goods Co., Cincinnati, Ohio.
Pioneer Pole & Shaft Co., Piqua, Ohio.
Owensboro Forging Co., Owensboro, Ky.
Edw. F. Alf Company, Cincinnati, Ohio.
Auto Vehicle Parts Co., Cincinnati, Ohio.
Eberhard Mfg. Co., Cleveland, Ohio.
Mutual Wheel Co.
Keystone Forging Co., Northumberland, Pa.
Brewer-Tichener Corporation, Cortland, N. Y.
L. C. Chase & Co., Boston, Mass.
Sheldon Spring & Axle Co., Wilkes-Barre, Pa.
Goodyear Tire & Rubber Co., Akron, Ohio.
C. C. Bradley & Son, Syracuse, N. Y.
Kelly-Springfield Tire Co., New York City.
F. S. Carr Co., Boston, Mass.
Raser Tanning Co., Ashtabula, Ohio.
Standard Parts Co., Cleveland, Ohio.
Conneaut Leather Co., Conneaut, Ohio.
Cleveland Hardware Co., Cleveland, Ohio.
Queen City Forging Co., Cincinnati, Ohio.
Wood, Smith & Co., Chicago Heights, Ill.
Illinois Iron & Bolt Co., Carpentersville, Ill.
Columbus Bolt Works, Columbus, Ohio.
Fernald Mfg. Co., North East, Pa.
Firestone Tire & Rubber Co., Akron, Ohio.
West Tire Setter Co., Rochester, N. Y.
Mossman, Yarnelle & Co., Ft. Wayne, Ind.
C. A. Willey Co., Hunter's Point, L. I., N.Y.
Backstay Machine & Leather Co., Union City, Ind.

Company Will Make Trailers

Organization of the Byron Engineering Works, a corporation which will manufacture automobile truck trailers and which will have an estimated annual output valued at from $500,000 to $750,000 is in process, according to announcement by J. Stoddard Johnston, Jr., who is acting as chairman of a syndicate of Louisville business men backing the new project.

The new corporation will have a capital of $175,000 and will manufacture pole trailers, four-wheel trailers and semi-trailers of three, five and seven-ton capacities for distribution throughout the United States.

O. E. Byron, an automotive engineer, will be one of the chief officers of the company and will be in direct charge of production. Mr. Byron was formerly associated with a successful manufacturer of truck trailers.

The local interest in the manufacture of trailers is the result of investigation of the business by Tampton Aubuchon, general manager of the Louisville Industrial Foundation.

Effect of Motor Truck Impact on Roads

Preliminary road impact tests made by the Bureau of Public Roads indicate that the impact pressure exerted by a motor truck in motion is about six times that of a truck at rest. The tests were conducted with a Class B Government truck loaded up to five tons, running up to 15 miles an hour and allowed to fall from varying heights on the impact measuring apparatus. These tests will be continued with trucks ranging from the lightest weight to the heaviest until complete data are obtained.

The question of the relative impact exerted by trucks with solid *versus* giant pneumatic tires will also be investigated. Definite arrangements have been made to secure a Packard three-ton truck with requisite tire equipment for these tests and a loan of other units would be welcomed by the Government officials..

Tests to show the resistance of various types of road surface such as concrete, asphalt, etc., are soon to be undertaken. About 50 road slabs built of these materials will be broken under the impact of a machine which approximates the impact effect delivered by motor trucks.

By measuring the amount of impact actually delivered by the motor trucks to roads and by proceeding further in testing the destruction of actual road slabs subjected to impact, Government officials hope to obtain very definite information which will permit them to design a high type pavement or high types that will resist definite traffic conditions.

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A PAGE FROM CINCINNATI

By Our Regular Correspondent

Carriage Trade Booming

The carriage and buggy manufacturers in and around Cincinnati are extremely busy and the factories are working to capacity. It is gratifying indeed that the business is holding up so well and orders are received from all parts of the country.

The trade never looked brighter and more prosperous, and from all indications this will continue for a very long time to come. It seems the buggy has "rejuvenated," judging by the demands for this time-tried and tested vehicle, and the manufacturers who were fortunate enough to remain in the industry are taxed to the limit with business.

Cincinnati always had the reputation as being the carriage center of the country and in years gone by was the home of a very large number of prosperous carriage builders. It appears that Cincinnati is again gaining headway in this direction. All along the line the carriage and buggy manufacturers are having a marvelous trade.

Materials of all kinds are commanding a good price and advances are made almost daily. Rubber and enamel goods, upholstery goods, wood stock, iron and steel are all on the upward trend. Leather is high and scarce.

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C. B. N. A. Convention

As the convention of the C. B. N. A. is rapidly approaching, the Cincinnati carriage manufacturers and the accessory trades are working hard to make the 47th annual meeting in Chicago a decided success. The Hotel La Salle will be the Cincinnati headquarters.

• • •

The Carriage Makers' Club

The September meeting and dinner which will inaugurate the fall sessions of the Cincinnati Carriage Makers' Club, will take place on the evening of the 8th, at Phillipi's Garden, in Westwood. This will mark the first meeting since the annual outing of the club in June, and a very large attendance is assured.

W. J. R. Alexander Returns

W. J. R. Alexander, former secretary of the Carriage Makers' Club, has returned to Cincinnati after a six months' visit to South America, where he journeyed in the interests of his firm, Beckwith-Chandler Co., New York, varnish makers. Mr. Alexander established agencies in the principal cities of South America, which are purchasing the Beckwith-Chandler products outright.

Mr. Alexander passed through the Panama canal to the west coast of South America, visiting the larger cities of Chile. Then he took the Trans-Andean railway across Argentina to Buenos Aires, traveling from the last named city to Rio Janeiro. From Rio Janeiro he used a Lamport & Holt line steamer for New York, a voyage consuming seventeen days. Mr. Alexander says there are plenty of large importers who are anxious to deal with the United States, but it is important to fill their orders according to agreement, as they are exacting, but not unreasonably so.

The returned traveler, being interested in horse-drawn vehicles, noted that these are still very much used in larger towns, but the small towns have very little of any kind of transportation facilities. Mr. Alexander snapped a picture of a coach such as are common in Panama City, and we have the pleasure of showing it to you on this page.



Panama coaches or "coaches" similar to this one are drawn by small ponies or mules. The fare is about 10 cents to take you anywhere in town.

• • •

The Anchor Top & Body Co. is increasing its facilities to take care of growing trade.

• • •

George S. Brown, of the Brown Carriage Co., is summering at "Sunset Lodge," Omena, Mich.

• • •

The Cincinnati branch of the Pioneer Pole & Shaft Co. has all the work it can do and is shipping orders promptly.

• • •

A. Nutter, of the A. Nutter Gearwood Co., Seymour, Ind., was visiting his friends and customers in Cincinnati during the month.

Cincinnati carriage builders will be well represented at the C. B. N. A. convention in Chicago this month.

• • •

Clen Perrine, of The Brown Carriage Co., returned from a motor trip through Michigan. He was accompanied by Mrs. Perrine.

• • •

Cincinnati accessory manufacturers are working day and night to supply the demands for their products. Never have they been so busy.

• • •

Jos. A. Niehaus, of The National Hardware Co., is having a very good trade and reports business with his house as being "rushed."

• • •

Theodore Luth, of Luth Carriage Co., accompanied by Mrs. Luth, is spending the month of August in Atlantic City, their usual vacation spot.

• • •

The truck manufacturers are deluged with business and are months behind with orders. This class of business in Cincinnati is having a wonderful growth.

• • •

The automobile dealers in Cincinnati are toiling hard to supply the demand for pleasure cars. It is a problem to get automobiles promptly from the factories.

• • •

Haberer & Co. are extremely busy. This concern specializes in commercial bodies and recently leased another large building. Jacob Haberer reports that commercial bodies are in greater demand than ever.

• • •

E. V. Overman, general manager of the vehicle spring and axle department of The Standard Parts Company, with headquarters in the Union Central Building, Cincinnati, is having a decidedly good trade.

• • •

The Carriage Manufacturers of the United States held another meeting at the Hotel Gibson, on July 24th. A. H. Ahlbrand, president of the C. B. N. A., presided, and made some timely suggestions regarding the coming convention of the C. B. N. A. in Chicago in September.

• • •

The Cincinnati Panel Co. has changed the name of the concern to The Cincinnati Auto Body Company. They make a specialty of manufacturing demountable tops and closed body work, and are having a very satisfactory trade. The officers of the company are B. H. Linnemann, president, and John R. Linnemann, secretary and treasurer.

• • •

Wm. Rossiter and his son Clarence have formed a partnership under the name of American Pole & Shaft Co. They have leased a large building at 1347-49 Harrison Avenue where they will engage in the manufacture of a full line of poles and shafts, painted and in the white. The Rossiters are very well known among the vehicle trade and they have the best wishes for success from their numerous friends and customers.

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Manufacturers Wanted to Build Trailers

It is acknowledged that to utilize the excess power of an automobile for tractive purposes is practical, provided it is used in connection with a trailer that has some positive method of trackage. The Behlen principle presents a trailer that combines the essential requirements of trackage with a mechanical design and construction that insures the proper performance thereof. Its greatest claim to distinction lies in the fact that it has finally evolved a principle by which the short-turn gear is made practical for every-day service under the most adverse conditions.

It is claimed that twice the energy required to turn an ordinary axle is the maximum energy that will ever be required to turn this gear—the lowest resistance mathematically possible to secure. It responds instantly to the slightest twist or turn of the leading automobile, and the entire gear derives great strength from the simple arrangement of its two moving parts. Of course, it possesses the stability and that quality to hold the road which is to be found only in the four-wheel trailer that tracks.

The combination of an automobile with a trailer built in accordance with the Behlen patents produces a vehicle of smooth and positive co-ordination of action. This construction embodies strength, simplicity, the elimination of strain caused by excessive leverages, and a perfect trackage.

With the development of the automobile at its height and the opportunity to secure an article whose merit has been demonstrated in actual use, there could not be found a more favorable time to embark in this new industry. Information cheerfully furnished upon request by Chas. A. Behlen, Fifteenth and Vine Streets, Cincinnati, Ohio

Manufacturers are wanted to build trailers under the Behlen patents on a royalty basis, in capacities of from one to five tons.

A Possible Revision of Tax Rulings

We are reliably informed that the authorities of the Treasury Department have under consideration a possible revision of the rulings made under the 1917 Revenue Act.

There seems to be some confusion in the automobile body trade between the provisions of the 1917 Act and those of the 1918 Act. As soon as a definite decision can be had from Washington relative to the contemplated revision, we hope to print an article that will clear up all uncertainty on the question of taxability of automobile bodies.

Alex Urquhart, general superintendent of the Auto Body Company, Lansing, Mich., for the past eighteen years, is now with the Lansing Body Company in the capacity of general superintendent. Mr. Urquhart is one of the best known body builders in the United States, having built bodies for the first cars ever produced by the Olds Motor Works, which was a pioneer large-scale automobile company.

Our Oldest Subscriber Passes Away

Thomas Payne, 119 Chester Street, Buffalo, N. Y., passed away June 16th last. Mr. Payne probably held the record of being the oldest subscriber to THE VEHICLE MONTHLY. His widow writes us that they celebrated the fiftieth anniversary of their wedding last



The Late Thomas Payne, Buffalo, N. Y.

May, but that Mr. Payne was a subscriber to our magazine when she first met him. She also tells us that from that time to the present the late Mr. Payne carefully preserved each number for future reference, with the result that he had a complete set of THE VEHICLE MONTHLY covering more than fifty years when he died.

Thomas Payne was born in Ireland, but went to Canada when three years old and resided with his parents in London, Ont. Leaving school he entered the carriage trade, working in London and Guelph, Canada, later going to Buffalo, N. Y., where he was successively employed by the Harvey Carriage Company, Bosche Bros. and The Harvey Auto Body Co. He was employed by the last-named company at the time of his death, in the capacity of body builder.

Mr. Payne died very suddenly. Not feeling well, he left the factory and returned home at 10 o'clock in the morning, and spent several hours sitting and walking in his front yard. Toward evening he was standing near his front gate when he suddenly fell dead.

Wheel Makers for Fifty Years

The New Wapakoneta Wheel Co., Wapakoneta, Ohio, has had more than fifty years' experience in building all kinds of light and heavy wheels. Their catalog gives a great deal of good information about wheels of all kinds, as well as wheel material. Write for it today.

If you are one of those manufacturers who have to pay out money for the clean hands of numerous employes, you will be interested in the "Soapitor System," which is claimed to cut down lavatory expense. For details, write to Soapitor Company, Inc., 154 West Fourteenth Street, New York City.

L. C. Graves Co. Build Plant Addition

L. C. Graves Company, Inc., Springboro, Pa., manufacturers of commercial car and truck bodies, have just completed an addition to their plant which will increase their production fifty per cent. This addition will be used by the machining and ironing shops.

Besides this, the company is spending about $30,000 in new machinery and the electrification of the entire plant, with individual motors on all machines. With these improvements, F. C. Darling, general manager of the company, says the plant will be able to take care of only present demand for their products, and that more extensive additons will soon be necessary.

The Late J. E. Hemmell

J. E. Hemmell, Baltimore, Md., late representative of THE VEHICLE MONTHLY in that city, passed away on July 16th last at a local hospital. He had been in ill health for some time.

Mr. Hemmell was born in Frederick, Md., January 9, 1835, and was therefore eighty-four years old in January last. In his youth he was a schoolmate of Admiral Schley, with whom he kept up an intimate correspondence until the death of the Admiral in 1911.

In the early days of THE VEHICLE MONTHLY, Mr. Hemmell was associated with



The Late J. E. Hemmell

the late I. D. Ware as a co-worker and contributor to the technical columns. He has been a contributor through all the years since that time, in all about fifty-two years, and up to his last illness had charge of subscriptions and collections in Baltimore, acting besides as Baltimore correspondent. He also did considerable literary work for newspapers in his home city.

Mrs. J. E. Hemmell, widow of the deceased, will continue the subscription and collection work for this journal in Baltimore. At present she is residing at 409 North Carey Street, in that city.

P. W. Gaylor, of the Clyde Cars Co., New York, is making an extensive business trip through eastern Asia and the adjacent islands.

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Highway Shipping Cheaper Than Rail

Careful comparison of the cost of shipping by motor truck and by rail, as made by the Fisk Rubber Co., of Chicopee Falls, Mass., shows that it is cheaper to make shipments from the factory to New York and Boston by motor truck than by railroad express or freight.

The analysis made by the company's road transportation department, which has been in operation for some time and has greatly developed, is based on the operation of fifteen motor trucks, including trucks of ¾, 2, 3 and 5 tons capacity. No trailers are operated with the trucks as yet, but the company has been considering the use of trailers as a means of still further reducing costs.

Comparative Figures

COST PER TON-MILE

To Boston or New York by Motor Truck, Full Load	To Boston Express	To Boston Freight	To New York Express	To New York Freight
	Cents	Cents	Cents	Cent
5-ton truck. 6.9	20.8	15.2	17.6	10.4
3-ton truck.10.5				
2-ton truck.13.82				
¾-ton truck.17.15				

COST PER TON-MILE BY TRUCK WITH VARIOUS LOADS

Load	¾-ton Truck Cents	3-ton Truck Cents	2-ton Truck Cents	¾-ton Truck Cents
5 tons...	6.9			
4 tons...	8.6			
3½ tons...	10.0			
3 tons...	11.5	10.5		
2 tons...	17.25	15.75	13.5-14 15	
1½ tons...	23.0	21.0	18.0-19.0	
1 ton ...	34.6	31.5	27.0-28.3	17.08
¾ ton ...	51.0	42.0	36.0-37.5	22.75

This table emphasizes strikingly the economy and importance of operating trucks at as nearly as possible their full capacity and also the superior economy of the larger trucks over the smaller units.

Outgoing shipments from the factory consist of automobile and truck tires and sundries and incoming shipments of tire fabric, litharge and valves. Following is an analysis of the freight and express costs, including haulage at both ends in the case of freight shipments and war tax on both freight and express shipments.

ITEMIZED FREIGHT RATES

Outgoing—

	New York Cents	Boston Cents
80% tires @ 63c. per cwt.....	50.4	50.4
20% sundries @ 42c. per cwt....	8.4	8.4
War tax @ 3%.....	1.8	1.8
Hauling, per cwt.....	45.0	40.0
Total	10.56	10.06
Incoming—		
50% fabric @ 30.5c. per cwt..	15.3	30.5
30% litharge @23c. per cwt....	6.9	...
20% valves @ 36c. per cwt....	7.2	...
War tax @ 3%.....	0.8	0.9
Hauling, per cwt.....	20.0	20.0
Total	50.2	51.4
Average per cwt.....	77.9	76.0
Cost per ton-mile (rate × 20 ÷ mileage)....	10.4	15.2

ITEMIZED EXPRESS

Outgoing and Incoming—

	New York	Boston
Express rate per cwt	126.0	99.0
War tax @ 5%.....	6.3	4.9
Total	132.3	103.9
Cost per ton-mile (rate × 20 ÷ mileage)...	17.6	20.8

Thus, it is cheaper for a company in or near Springfield, Mass., to do its hauling to Boston with its own motor trucks of 2, 3 or 5 tons capacity than to ship by freight, provided full loads are carried by the 2- and 3-ton trucks and loads of 2½ to 5 tons are carried by the 5-ton trucks, and is cheaper to haul to New York with its 5-ton trucks, loaded with 3½ to 5 tons than to ship by freight.

To ship to Boston by express costs more than to ship by trucks of 1 to 5 tons capacity, provided the 1-ton trucks are loaded to capacity, the 2-ton trucks carry 1½ to 2 tons, the 3-ton trucks carry more than 1½ tons and the 5-ton trucks carry 1¼ tons or more.

Tire Retreading a Basis for Promoting Schemes

The Savold Tire Corporation and other companies which advertise patented or secret processes in connection with "rebuilding" automobile tires, are the subject matter for a bulletin issued August 4th, by the National Vigilance Committee of the Associated Advertising Clubs of the World (110 West 40th Street, New York City), and the advertising association has announced that copies of the report will be sent to interested business men who address a request for it on their letterheads.

The report is based upon an investigation made by Richard H. Lee, special counsel of the advertising association in charge of investigations.

Mr. Lee shows in this report that it is quite a fad, now, among certain promoters, to "glorify" the tire-rebuilding business, this being all the easier since automobile tires cost more than they once did. The public is inclined to believe that old tires can be saved easily, their belief that a better system for saving tires can be invented being born more or less of their wish for such a system.

The Fruehauf Trailer Co., Detroit, has purchased a five-acre factory site at Harper Avenue and the Detroit Terminal Railway, in that city, about two miles from the company's present location. A modern plant will be erected and considerable new machinery installed. Plans for the building are well under way.

The Detroit Trailer Co. has moved into its new factory building recently erected at 27-37 Jos. Campau Avenue, at Atwater Street, Detroit, where it has increased manufacturing facilities.

The C. B. N. A. Convention

The forty-seventh annual convention of the Carriage Builders' National Association will be held at the Hotel LaSalle, Chicago September 23, 24 and 25.

The annual exhibition of parts of carriages, wagons, automobiles, gears, springs, axles, and materials used in their construction will be held at the same place September 23, 24, 25 and 26, 1919.

Ample space for the exhibition and a commodious hall for the convention are both provided in the Hotel LaSalle. It has been found this plan of keeping all under one roof to be satisfactory for all who attend.

The official headquarters will be at Hotel LaSalle, located at Madison and LaSalle Streets. The location of the headquarters hotel is particularly desirable. It is in the midst of the city's activities and is easily accessible to and from all parts of Chicago. All members, exhibitors and visitors to the convention are requested to make reservations at this hotel. Special rates have been made for all attending the convention.

At the Hotel LaSalle, in addition to the regular a la carte menu, you may secure special meals at the following prices: Breakfast, 75 cents; luncheon, 75 cents; dinner, $1.00

We believe the concessions in rates made as stated above will enable everyone attending the convention to stop at the headquarters hotel. It is advisable that reservations be made as far in advance as possible, by letter direct to the hotel.

The annual banquet will be held on Thursday evening, September 25th, at the above-named hotel.

The members of the association and the vehicle trade in general will find a hearty welcome in Chicago, where the association held a profitable convention two years ago.

The second city in the United States presents many places of interest, aside from the convention. No more pleasant place could be found for a vacation trip in September.

With the ordinary currents of trade disarranged by the recent war, it is important that every vehicle manufacturer should attend the convention this year. There will be big things to do during the reconstruction period.

Factory Expansion of Simms Magneto Company

The Simms Magneto Company has just closed a contract for the addition to their plant at East Orange, N. J., of a concrete building, 152 feet long by 66 feet, 8 inches wide. The walls of this building are to be made of strength sufficient for carrying three additional stories to take care of future expansion. Orders have been placed for the necessary equipment and automatic machinery. The work is to start immediately and will be completed in 90 days. A further indication of the sound and yet rapid growth of the Simms Magneto Company is given by the fact that six years ago they had only 125 employes, whereas today 600 are employed.

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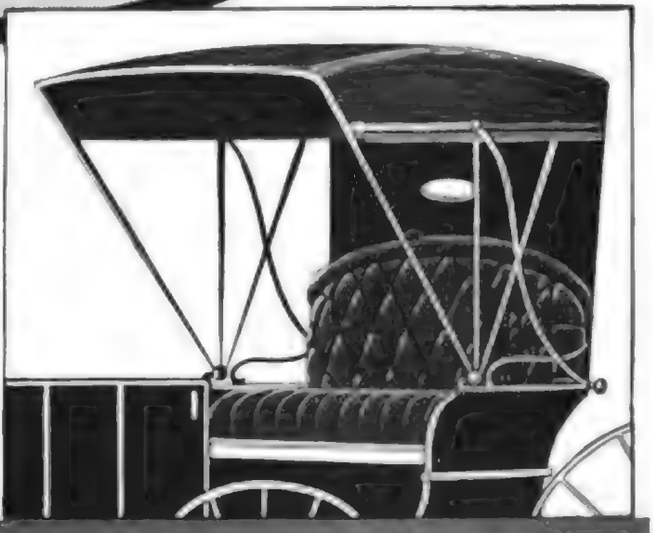
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The Dependable
LEATHER CLOTH

Made in a variety of
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The rains descended and the floods came



The Waterproof

HASKELITE

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-and Haskelite, of course, was *waterproof*

A belt broke one day last month in a phonograph-cabinet factory. Before it could be caught it snapped the nearest automatic sprinkler-cock and jarred it into action. Water couldn't damage the machinery, and there would have been no cause for apprehension if a pile of fine flat plywood panels hadn't been lying right in the middle of the downpour. And before the stream could be checked those panels were running with water.

The manufacturer foresaw a lot of good money lost in checked panels—ruined by the water. He had never seen a plywood before that would stand a wetting and then finish up into cabinet work worthy of the finest phonograph.

These panels, however, were Haskelite—water*proof*, mouldable plywood.

A Haskelite man was in the plant when the accident occurred. The manufacturer asked his advice. "Dry 'em out. They're all right," the Haskelite man said.

They were allowed to dry. They *were* all right. They hadn't checked, because Haskelite plies are bound with a waterproof glue that has met a 400-hour boiling test without parting. They hadn't warped because this glue impregnates the very fibre of the wood, and doesn't allow one ply to pull against another. The manufacturer put them into fine cabinets, none the worse for their wetting, and they passed exacting inspection.

You aren't making phonographs, but you want a plywood that is waterproof under any conditions. There is only one. An inquiry at either of our offices by mail will bring you full scientific data compiled by our research department, and an astounding record of actual performance of Haskelite with the 600 body-builders who are now using it.

HASKELITE MFG. CORPORATION

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Chamber of Commerce Building

GEORGE R. MEYERCORD, *President*

NEW YORK
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Plants at Grand Rapids and Ludington, Mich. Capacity 30,000,000 feet a year.

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Hints on Care of Tires

From the Kelly "Kant Slip" for August.

The Pressure Should Be the Same in All Seasons

"Should I increase the air pressure in my tires in winter?" is a question that many motorists ask. Tire air pressure should remain the same winter and summer.

Many car owners labor under a false impression regarding the tire pressure. Regardless of the season of the year it is impossible to increase the pressure in pneumatic tires sufficiently to in any way injure them. Tires should not be pumped up harder in the winter months. Likewise pressures should not be reduced in summer because decreases cause the tires to bend more, create more friction and naturally to generate heat.

Motorists are inclined to make a complicated matter of inflation. While too little pressure is extremely important and is undoubtedly the biggest abuse tires are put to, determining the proper air pressure for tires is really a simple matter.

Even a tire gauge is not absolutely necessary. Just stand in front or rear of your car and observe that the tires are full and round—that they do not sag noticeably under the weight of the car. However, the tire gauge should be used to confirm your judgment. Proper inflation is so important that no chances should be taken. At all times the tire should receive the benefit of the doubt.

Oil and Gas Will Ruin Tires

Oil and gasoline are deadly enemies to automobile tires. If you don't believe it, take a small piece of rubber, a rubber band, for instance, and immerse it in gasoline. Watch it swell—grow before your eyes. Then, after allowing it to soak for a short time, just stretch that rubber—no life or vitality left.

Gasoline has a similar effect on automobile tires. "Gas" eats a weak spot into the tread or sidewall, as the case may be, starting deterioration. Oil and grease have the same effect on tires as gasoline.

Great care and vigilance should be exercised in the use of oil around a garage. Oil or gasoline should not be allowed on the floors. Spare tires should always be protected by cover.

The manufacturing business of A. J. Miller & Co., Bellefontaine, Ohio, will be continued and enlarged by Lee M. Lentz and John W. Grabiel, executors of the estate. H. V. Goodenough, who has successfully managed the business for several years, will be retained as general manager. Allie J. Miller, former head of A. J. Miller & Co., died at Columbus, Ohio, on June 26th.

Harry H. Hawke, general sales manager for the Traffic Motor Truck Corporation, St. Louis, Mo., announces the appointment of J. Albert McCollum as advertising manager. Mr. McCollum for many years has been in charge of the automobile advertising of the St. Louis Republic and is well known both in local and foreign fields. G. Elmo Holke, assistant advertising manager, will remain as such and edit the company's house magazine, "Horse Sense."

The Christie "Miracle" Lock

Builders of paneled commercial bodies, provided with rear doors, either single or double, will be interested in an improved door lock made by Bremner & Terris Mfg. Co., 542 W. Jackson Boulevard, Chicago. This lock,



THE CHRISTIE "MIRACLE" LOCK.
Made by Bremner & Terris Mfg. Co., Chicago.

known as the Christie "Miracle" Lock, can be applied right or left handed on either single or double doors. It is claimed to eliminate all rattle or sagging and prevents doors from getting out of shape.

Tells How Rubber Tires Are Made

An addition to tire literature which will be welcomed by the motor vehicle trade and others interested in obtaining information concerning how tires are made, is "The Story of the Tire," a booklet now being distributed by The Goodyear Tire & Rubber Company, Akron, Ohio.

This booklet is not designed as an advertising feature, but contains the plain story of the various processes in tire manufacture, tracing it from the sap of the forest tree to the finished product, ready to begin its career of service.

The booklet opens with a foreword calling attention to the exalted position occupied today in the world of rubber—how the tiny drops of sap from the rubber tree, carefully collected, go to make up the hundreds of thousands of tons of crude rubber necessary to supply the world's needs, for rubber is now one of civilization's necessities.

The manufacturing process is followed through the various operations of washing, drying, compounding, mixing, spreading and calendering, tracing the rubber up to the point of its utilization in making up the various types of tires; for use on bicycles, motorcycles, airplanes, automobiles and motor trucks.

The work is illustrated with photographs which help to bring home to the reader its message. It is intended for distribution among students, teachers, educational institutions, libraries and all persons interested in rubber. In fact its publication was inspired primarily by the numerous requests received from all parts of the world for "information about rubber."

Any person sufficiently interested in this booklet to write The Goodyear Tire & Rubber Company, Akron, Ohio, requesting a copy, will receive one, free of all charges.

We are in receipt of a twelve-page pamphlet describing and illustrating the well-known "E. D." short turning and tracking devices for four-wheeled vehicles. They are applied to automobile trailers, industrial trucks and horse-drawn vehicles, and are made by the Eadie Vehicle Gear Co., New York City.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

BODY MAKERS WANTED.—First-class body makers wanted for high class closed automobile body work. We prefer custom builders. Highest wages, steady work, ideal working conditions, no labor trouble. In answer please state age, nationality, and how soon you could start work. Address MICHIGAN HEARSE & MOTOR CO., Grand Rapids, Michigan.

FIRST-CLASS TRIMMER WANTED. We have an opening for a high-class experienced coach trimmer. We want a man who can take full charge of trim shop as soon as accustomed to our plant, which is new, with working conditions ideal. Please state salary expected to start, nationality, age and general experience and ability. Address MICHIGAN HEARSE & MOTOR CO., Grand Rapids, Michigan.

FOREMAN WANTED. For mill of prosperous New York State auto body plant producing 1,500 bodies monthly; must be thoroughly versed in all short cuts on interchangeable quantity work; give full experience in first letter. All replies confidential. Address "445," care THE VEHICLE MONTHLY, Philadelphia.

FOREMAN WANTED. In rough mill, New York State plant; must know lumber and production to handle rough mill end under general foreman of mill. Give full experience in first letter. All replies confidential. Address "450," care THE VEHICLE MONTHLY, Philadelphia.

WANTED—BY RESPONSIBLE CONCERN, THE PURCHASE AND AGENCY FOR NEW ENGLAND OF STANDARDIZED CLOSED BODIES AND WINTER TOPS. ADDRESS "450," CARE "THE VEHICLE MONTHLY," PHILADELPHIA

WANTED. Automobile trimmers, body builders, assemblers, glass men and painters. Address "450," care THE VEHICLE MONTHLY, Philadelphia, Pa.

WANTED. Draftsman for commercial auto body work. Address LOCK BOX 79, Mifflinburg, Pa.

WANTED.—First-class foreman trimmer; permanent position. State experience and give references. ALEX. CHRISTIE & CO., Seattle, Washington.

WANTED

Man to take charge of service stock room in large automobile factory.

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Care The Vehicle Monthly
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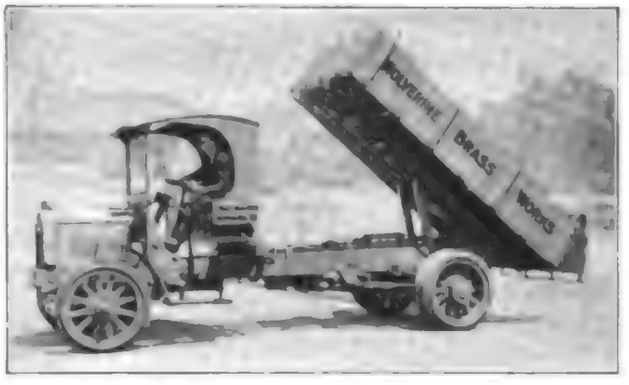
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No Driver, No Hard Work, Can Harm this Transmission

The Gramm-Bernstein transmission of today—completely trouble-proof—is the result of a conclusion reached by B. A. Gramm, eight years ago.

That conclusion was that the transmission is the real heart of the truck—the very root of truck service.

Mr. Gramm determined to eliminate the sources of trouble which were then, and are now, common to ordinary truck transmissions. He did so with gears that are always in mesh—whose teeth can never be ground, chipped or broken by the impact of shifting.

This transmission has saved thousands of dollars for Gramm-Bernstein owners in repairs and replacements.

It is actually a basic superiority. *It is absolutely proof against every injury that might be inflicted by careless driving or hard usage.*

No driver can possibly damage Gramm-Bernstein gears in changing speeds.

Simply because the gears themselves are never shifted. They are always in mesh. Speed changes are made by shifting patented dog clutches.

No part of the gear assembly can work loose, fall out, and possibly damage the entire set. That is impossible, since all gears, bearings and dog clutches are mounted on a heavy six-spline shaft, and can never get out of alignment.

No pin, bolt, nut, set-screw, stud, or key is used to hold the gears in place on the splined shaft.

Literally, there is nothing in the Gramm-Bernstein transmission which can work loose and cause trouble.

Every truck in the worm-drive Gramm-Bernstein Pioneer line carries this wonderful transmission.

Mr. Gramm pioneered the truck industry 18 years ago.

Gramm-Bernstein again pioneered with this transmission, which is proof against every trouble, from without and within.

Now, for the third time, Gramm-Bernstein leads the way by selling its trucks completely equipped, ready for the body, and with not an extra to buy.

In most cases this means a very considerable initial saving.

All-worm-drive Gramm-Bernstein models—2, 2½, 3½ and 5-ton—are sold at a flat price, including all equipment and ready for the body suited to the buyer's requirements.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Patent Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194994.

The Gramm-Bernstein Motor Truck Co.

Pioneers Since 1901—Builders of the First Liberty (U. S. A.) Truck

Lima, Ohio, U. S. A.



ON THOUSANDS of trucks of all sizes and weights Caterpillars are saving fuel and oil, lowering upkeep costs, adding to the life of the trucks and giving extraordinary mileage.

The Caterpillar is the only type of truck tire yet developed which is suitable for trucks of *all* sizes.

Why not show the truck owners in your vicinity the advantages of standardizing their tire truck equipment?

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KELLY SPRINGFIELD TRUCK TIRES

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If you appreciate service of this character, we are ready to submit ideas and estimates on any kind of commercial printing you may require.

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EVERY owner whose vehicle you equip with Firestone Tires has friends who are your prospects and, eventually, your customers.

Firestone invented and perfected all the worthwhile improvements in this type of tire. Their strong, resilient service built up leadership, and now the name, Firestone, sells them to the wise, experienced buyers.

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FIRESTONE TIRE & RUBBER COMPANY
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Firestone
CARRIAGE TIRES



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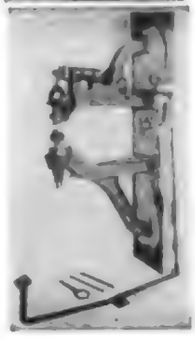
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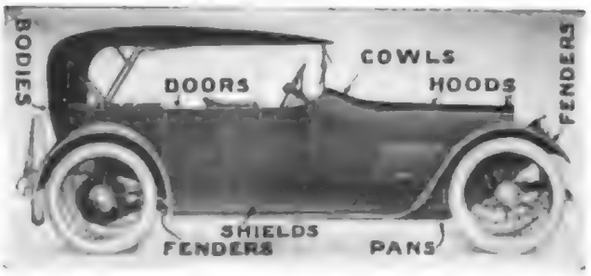
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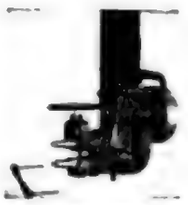
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"QUICKWORK" Machines have become standard, replacing ordinary equipment throughout the world. There are over 30 different "QUICKWORK" Machines—the most complete, uniquely—effective, cost-reducing, quality—improving line of sheet metal working machinery in existence.

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THE QUICKWORK COMPANY H. COLLIER SMITH, Pres. and Genl. Mgr.
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When a little time spent investigating Defiance Bending Machines would lead to the salvage of your present material wastage—increase your present output, and reduce losses in breakage to a minimum. Defiance Bending Machinery is serving wood benders everywhere throughout the world. Its success, so pronounced and long continued, proves Defiance methods of wood bending the most correct in use today.

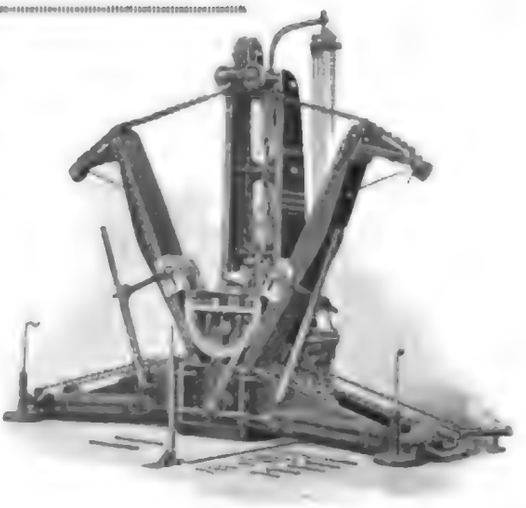
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Illustrated and descriptive matter on your requirements in wood bending machinery will be mailed on request

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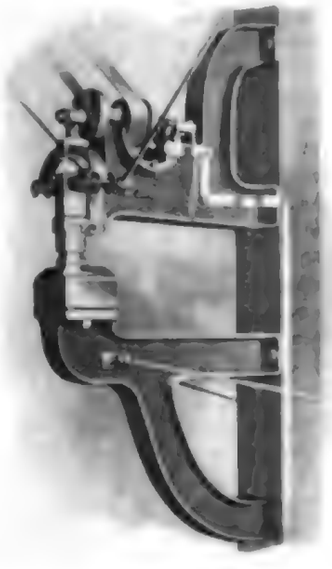
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No. 50. Rim, Felloe and Hound Bending Machine



No. 2. Patent Automatic Double Equalizing Machine



USE THE STANDARD AUTOMATIC HAMMER

For hammering into shape all panels, doors, hoods, roofs, fenders, etc. This hammer is recognized as the STANDARD machine on the market for automobile body work and for all metal work.

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Bodies for every business

Good Profit—Small Expense—Quick Turnover

MARGIN minus expense multiplied by turnover is the formula that states the dealer's profit. Apply it to the Trailmobile and the big possibilities for making money are as plain as day.

The profit margin is about the same as that on the most sought for trucks.

Expense of handling is less than on any line our dealers have ever sold.

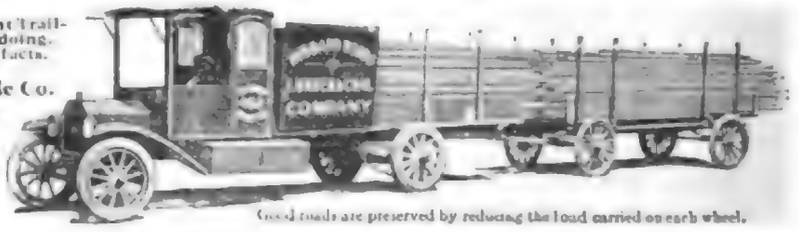
Turnover under the arrangement we offer ranges from 12 to 20 times a year for energetic and able dealers.

And the Trailmobile makes friends, builds good-will and increases the volume done every year.

Find out what present Trailmobile dealers are doing. Write now for the facts.

The Trailmobile Co.
502-522 E. Fifth St.
Cincinnati, O.

Contractors to the U. S. Government.



Good roads are preserved by reducing the load carried on each wheel.



Hand Hoist for Ford Truck

(Patents Pending)

TAKES no room back of cab, is easy of operation, simple and neat in appearance.

Shipped on sub-frame, ready for mounting on chassis. Easiest for the body builder to install and best—because it always makes a satisfied customer.

Write for photos and blueprints.

Truck Engineering Company
7031 Broadway
CLEVELAND, OHIO

Drop Forge It



"Stiles" Automatic Friction Roll Drop Hammer

YOU'LL save money, time, labor and have a carriage, wagon or motor part that is stronger and better looking than any casting.

We make **Drop Forging Machinery** to meet all requirements, also Presses for Metal Stamping.

Let us send you descriptive matter covering your particular requirements. Write today.

E. W. BLISS CO.

40 ADAMS STREET :: BROOKLYN, N. Y.

Chicago Office
Peoples Gas Co. Bldg.

BLISS

Detroit Office
Dime Bank Building

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TRADE S.W. MARK

Specialties in Steel

Suggestion No. 2 gives a very clear conception of the use of steel to take the place of castings.

In this one article has been combined three parts necessary to a trunk; *i. e.*, a corner iron, a hinge and a dowel.

Should this suggest to you a reason why you could use to good advantage similar articles made by forming steel, your correspondence will be given earnest attention by Dept. V. M. 2.

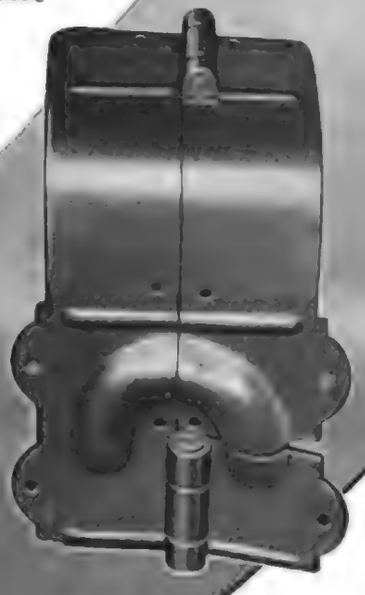
Special Productions Department

THE STANLEY WORKS

NEW BRITAIN, CONN.

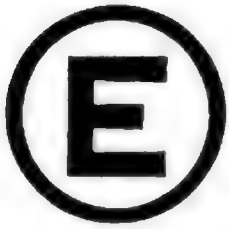
New York
100 Lafayette St.

Chicago
73 E. Lake St.



"Specialists in Wrought Steel Specialties"

Thousands of combination Hinges and Hasps for Gun and Arm Repair Chests were made by us for our Government during the war



IRONS NEEDED IN THE CONSTRUCTION OF THIS BODY

Size A, Straight End			Size B, Curved End	
1 set	No. 5692	Acme Door Lock	1 set	No. 5692
6 pieces	9515-E	Door Hinges	4 pieces 2 pieces	9515-E 9515-H
1 pair	6137-A	Rear Post, Inside Body Braces	1 pair	6136-A
6 pieces	6135-C	Side Post, Inside Body Braces	6 pieces	6135-C
6 pieces	4426-D	Roof Rail Corner Irons	6 pieces	4426-D
1 pair	6220-B	Rear Post, Top Rail Corner Irons	1 pair	6220-B
2 pieces	4380-B	Top Rail Corner Plates, front	2 pieces	4380-B
4 pieces	4485	Body and Chassis Connections	4 pieces	4485

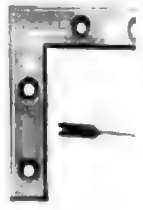
EMCO MALLEABLE IRONS

Write for our Bulletin "ASSEMBLIES OF IRONS"

This page illustrates one of these assemblies, showing our stock irons and their application on a standard job.

The Eberhard Manufacturing Company

CLEVELAND, U. S. A.



No. 4380



No. 9515



No. 4485

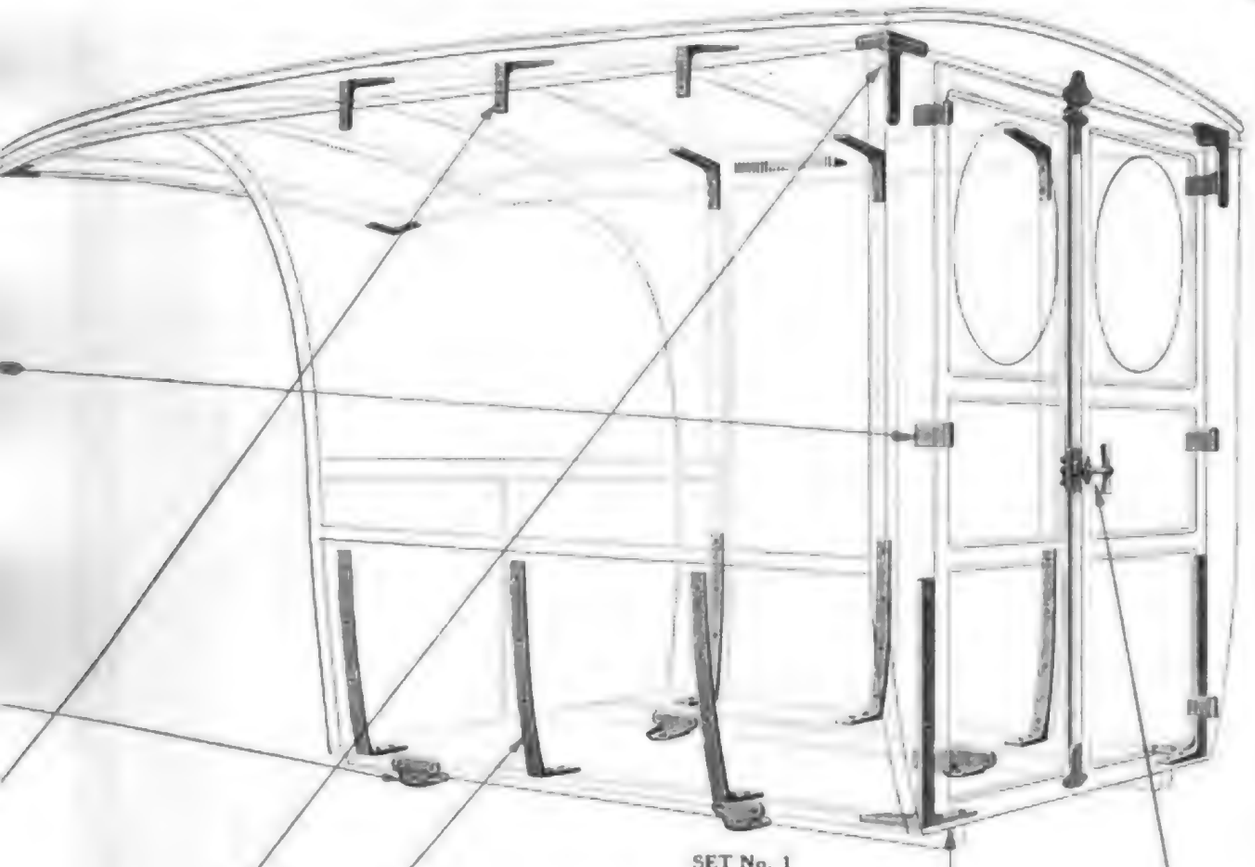


No. 4426



No. 6220

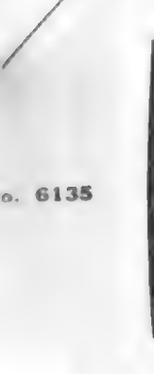
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SET No. 1

FULL PANEL BODY, CURVED SIDES

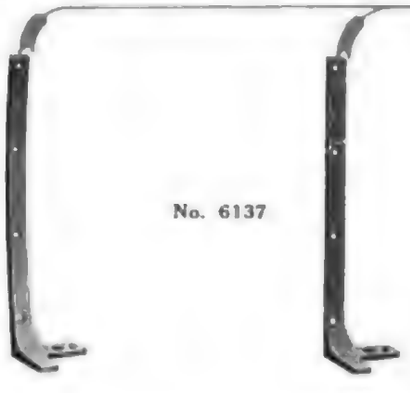
BODY TO FIT ON REAR OF FORD ROADSTER BODY



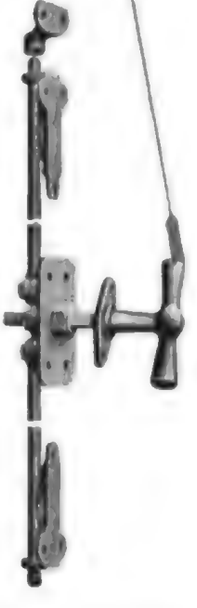
o. 6135



No. 6136



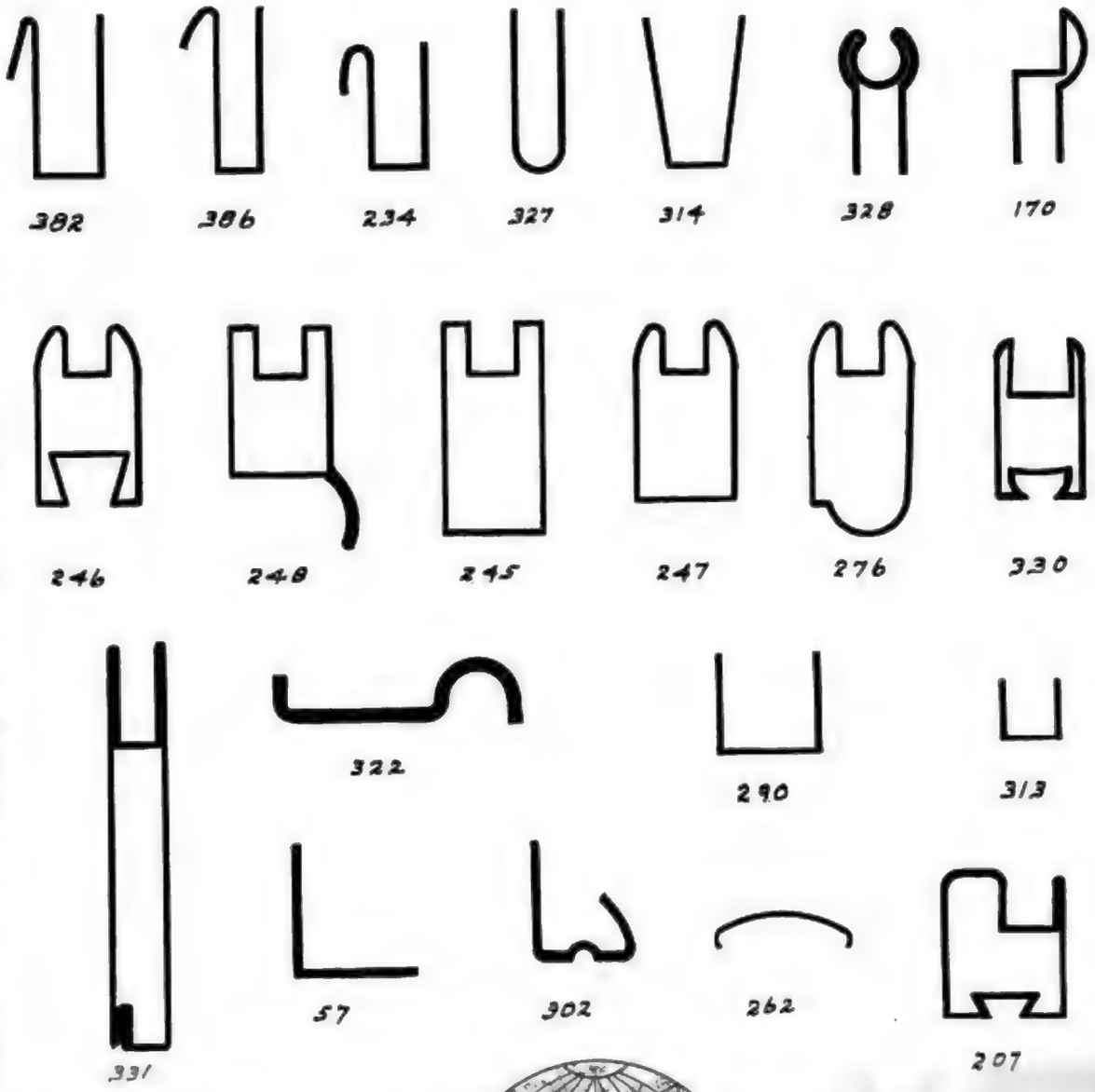
No. 6137



No. 5692

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AUTOMOBILE MOULDINGS



EMPIRE

ART METAL CO. Inc.

COLLEGE POINT, N. Y.

What is Spring Service *for* A Nation?

ALL SPRINGS
for ALL Popular Cars
Always in ALL Stocks

Allen Apperson
Briscoe Buick Cadillac
Chandler Chalmers
Chevrolet Crow-Elkhart Detroiter
Dodge Dort Elgin
E. M. F. Empire
Federal Flanders
Ford Grant Haynes
Hudson Hupmobile
Interstate Krit
Mitchell Maxwell
Monroe Oakland
Oldsmobile Overland Page
Pullman R. C. H.
Regal Reo
Republic Saxon
Scripps-Booth
Smith Form-A-Truck
Studebaker
Vim

Our Own Branches with Complete Stocks

Direct Factory Branches
Atlanta, Ga.
Boston, Mass.
Dallas, Tex.
Minneapolis, Minn.
Reading, Pa.
Kansas City, Mo.
Sumter, S. C.
Factory RICHMOND, IND.

VULCAN QUALITY
The Replacement Spring

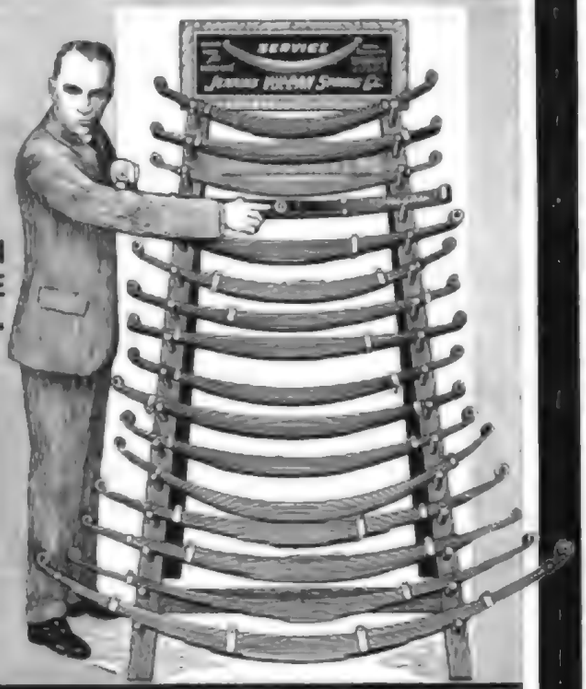
VULCAN "Spring Service for a Nation" enables Dealers everywhere to supply a spring for any car without delay.

It means:

¶ 100,000 Springs constantly in stock.
¶ Seven Distributing Branches.
¶ Over 7,000 Dealers now selling VULCANS.
¶ Demand—Sales and Profits.

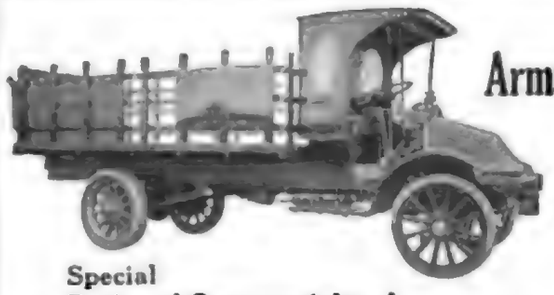
Write for Dealers Proposition.

FREE
This splendid stand given FREE with first order.

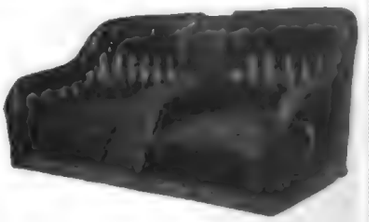


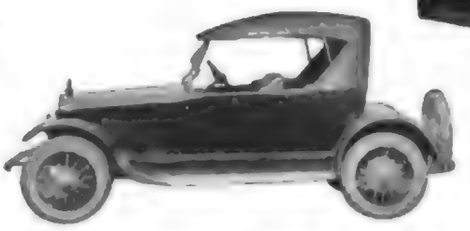
Jenkins VULCAN Spring Co.
RICHMOND IND.

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THE
Armstrong-Johnston Mfg. Co.
COLUMBUS, OHIO





Special Designed Commercial and Pleasure Car Bodies

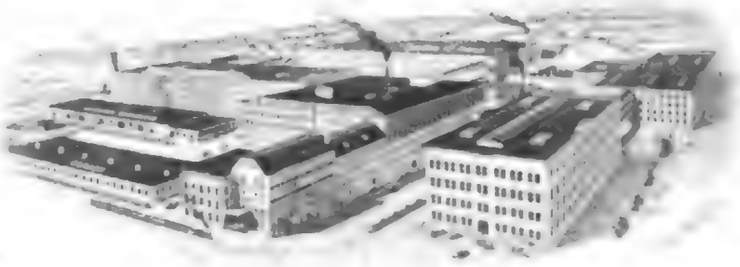
Send blue prints and specifications for estimates

TRUCK SEATS
SEAT BASES
CAB TOPS

BABCOCK BODIES

AUTOMOBILE CLOSED BODIES
(Aluminum)

SEDANS COUPES
LIMOUSINES
TAXICABS



HEAVY DUTY TRUCKS

FINE PANEL DELIVERIES

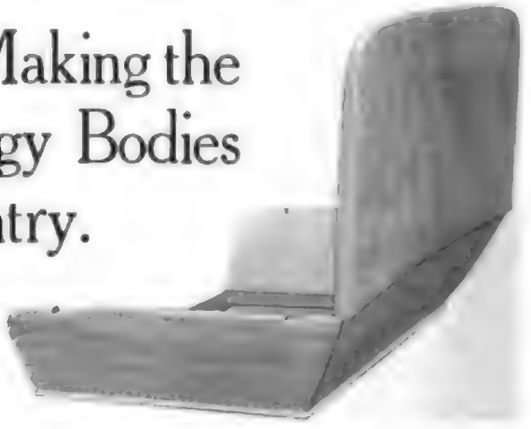
BUSES AMBULANCES

FUNERAL BODIES

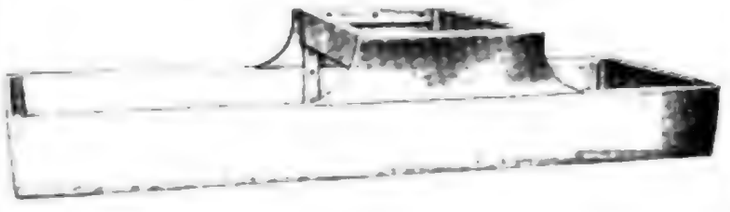
H. H. Babcock Co. **Watertown, N. Y.**

We Have the Reputation of Making the Best Automobile Bodies, Buggy Bodies *and* Buggy Seats in the Country.

Our Products are Quality. Deliveries Always Prompt and Our Prices Attractive



We Solicit Inquiry and Will Quote Promptly



Ames Body Corporation
INCORPORATED
Successor to CARRIAGE WOODSTOCK CO.
Owensboro - Kentucky

Mention The Vehicle Monthly when writing to advertisers.

Dealers Here's a Winner

The hand operating device, quick action and excellent construction of the

JENNINGS PATENT AUTOMATIC DUMP BODY

Make it a real interesting seller

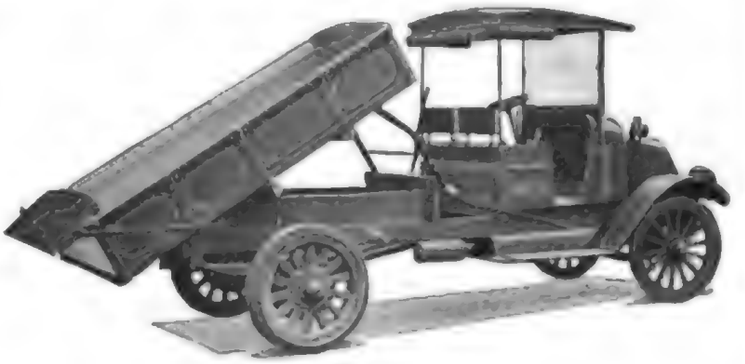
No expensive or intricate hoists to take up valuable room or cause trouble.

A very clever but simple lever device enables one man to dump the load in ten seconds.

An automatic locking device prevents body from dropping back.

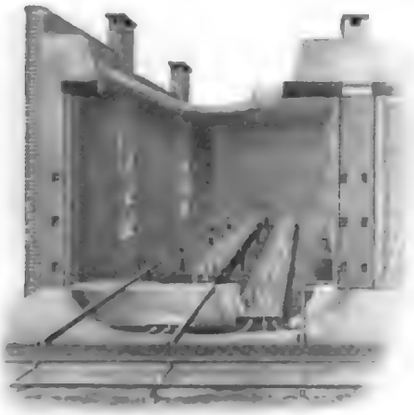
We build this body for any make of chassis in capacities from one to four yards.

Write now for catalog and agency for your district



SHOWING BODY WHEN DUMPED

THE COLUMBIA WAGON CO., Columbia, Pa.



It Dries Oak Green FROM THE SAW

Any lumberman will tell you that's proof a-plenty for the success of

THE NATIONAL DRY KILN

It also dries all other kinds of lumber, from the lightest of soft wood for panel work to heavy green hickory billets for motor truck spokes.

Our booklet *"21 Answers"* will be found very valuable. Ask for it, also for a copy of the National Catalog.

THE NATIONAL DRY KILN CO.

1200 EAST MARYLAND STREET -:- INDIANAPOLIS, IND.

VENEERED ROOF PANELS

for Closed Body Construction

GLUED WITH WATERPROOF GLUE or HIGH GRADE HIDE GLUE

Wagon Side Panels
Dash Boards Marqueterie Panels

ROOF PANELS MADE WITH FIFTEEN DIFFERENT SWEEPS IN LENGTH AND WIDTH

NEW JERSEY VENEER CO. PATERSON, N. J. U. S. A.

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Manufacturers Wanted

To build under Behlen patents, on a royalty basis, trailers and trailmobiles in one to five-ton carrying capacities. This is a splendid opportunity to establish yourself firmly with this infant but fast-growing industry, the coming short-haul railroad. *Address:*

CHAS. A. BEHLEN
15th & Vine Sts., Cincinnati, Ohio

Truck Dealers and Manufacturers

Do you make your own Commercial Bodies?

We specialize on "Up to the Minute" truck bodies of all types. Ford truck and delivery bodies carried in stock.

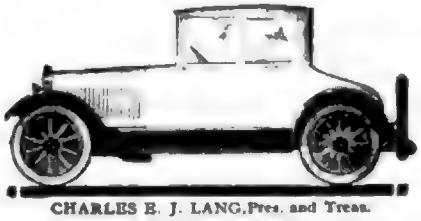
Ask for catalog and prices on special bodies

L. C. GRAVES COMPANY
SPRINGBORO, PA.

THE LANG BODY COMPANY

MANUFACTURERS OF

Automotive Bodies



CHARLES B. J. LANG, Pres. and Treas.

CLEVELAND, OHIO



ELMER J. LANG, Vice Pres. and Gen'l Mgr.

Motor Wheel Repairing

Made Worth While by



SCHWARZ WHEEL SPIDERS

They eliminate the nuisance of taking out damaged spokes and inserting new ones.

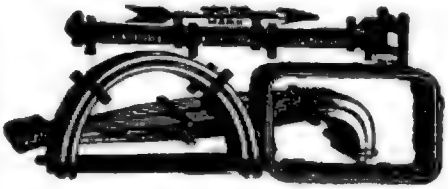
Just apply felloes and metal rim and job is complete.

Write for Further Particulars and Prices

SCHWARZ WHEEL CO.
FRANKFORD, PHILADELPHIA

BENT WOOD WORK

of Highest Standard. Rims and Shafts



BOWS A SPECIALTY

EMPIRE BENDING WORKS
S. M. SKEEN, Proprietor LANCASTER, PA.



Eagle "Mikado" Pencil No. 174



Regular Length, 7 Inches

Use No. 314 "Eagle Draughting" in your Draughting Department.
Use "Eagle 174" Nos. 1 and 2 in your office.

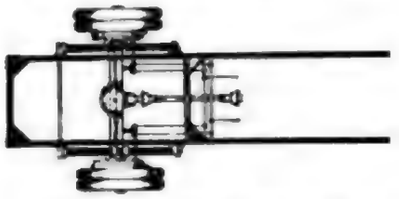
For sale at your dealer, 5c each. Made in 6 grades. Conceded to be the finest pencil made for general use.

EAGLE PENCIL COMPANY ▸ New York

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LUVERNE TRUCKGEARS

For Converting Cars Into Motor Trucks



SIZES FROM ONE TO FIVE TONS

Ask for Price List K

LUVERNE AUTO CO. :: Luverne, Minn.

Porter's BOLT CLIPPERS

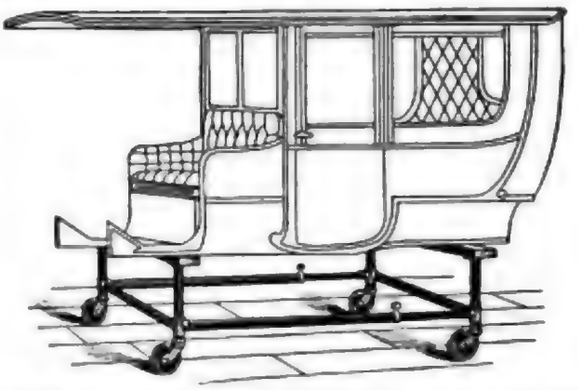
THE BEST



"EASY" Nos. 1 and 2 — Parts always to be had

"NEW EASY" Nos. 0, 1, 2, 3 — Porter's name on all genuine tools

H. K. PORTER Ashland St., EVERETT, MASS.



EXTENSION BODY TRUCK

Will add to your facilities in Handling Work in the Wood, Smith, Paint and Trim Shop.

It is indestructible and soon pays for its cost

WM. BECKERT & SON, 1065 E. Ohio Street, N. S., PITTSBURGH, PA.

AUTOMOBILE Body Sheets

Also materials for Tanks, Hoods, Guards, Fenders, Radiators, Frames, Etc. "THURITE" Deep Drawing Stock, Enameling and Japanning Stocks, Roofing Products, Etc.

AMERICAN SHEET AND TIN PLATE COMPANY, Frick Bldg., Pittsburgh, Pa.

Send for Bundling Table card and booklet on Black Sheets and Special Sheets.

Wheels for Trailers and Automobiles

Hickory Nut and Acorn Brands

Medium and Heavy Sarven with Tires.

Artillery types—Light to Heaviest sizes with Steel or S. A. E. Bands.



Noted for quality, workmanship and seasoned stock.

Prices quoted on receipt of full specifications.

Crane & Mac Mahon, Inc.

St. Marys, Ohio — 8 Bridge Street, New York City

The Answer

TO THAT TRAILER AXLE QUESTION IS

The Concord Plain Bearing Axle

It has proven its worth in actual trailer service. Made for light, medium and heavy work.

We can deliver promptly. Write for particulars.

CONCORD AXLE COMPANY - PENACOOK, N. H.

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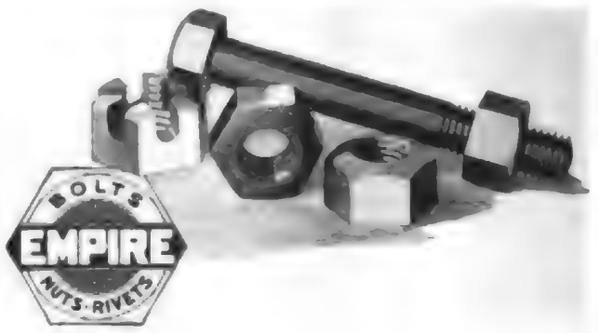
SOSS
INVISIBLE HINGES

There's a particular type to meet the requirements of every purpose.

The locking device prevents lateral movement. The non-corrosive, water-proof case prevents water from causing rot in the pillar.

The quick detachable feature, the ease with which they can be installed—all explain why SOSS HINGES are so universally used in better cars.

SOSS MANUFACTURING Co.
BROOKLYN, N.Y.



Guarding Against Flaws

IT is not enough that the quality of Empire Bolts and Nuts is assured by manufacturing methods and mechanical equipment found in no other plant in the world.

We go further than that, and *inspect* every bolt and nut during each stage of production and again as a finished product. No imperfections are allowed to creep in.

That is our way of safeguarding users of Empire Bolts and Nuts—the way *you* can afford to have it done.

RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
PORT CHESTER, NEW YORK

C. COWLES & COMPANY New Haven Conn.
ESTABLISHED 1838
HARDWARE, MOUNTINGS AND TRIMMINGS
Everything for Limousines and Landaulettes

Rubber-Covered Handles; Ventilators; Disappearing Corner Lights; Dome and Pillar Lights; Electric Cigar Lighters; Security Locking Handles; Concealed Toilet Cases; Curtain Rollers; Speaking Tubes; Mechanical Window Lifts; Anti-Rattlers; "Banner" Window Locks; Tail Lights; Filled Mouldings, etc.

CURTAIN FASTENERS—All styles and finishes.
BRANDS: SUCCESS, IDEAL, PERFECT, BREWSTER, EXCELSIOR.

Franklin Photo-Engraving House

quality engravings for the adornment and illustration of printed matter, business literature, catalogs, booklets, etc., etc. : :

632 CHESTNUT STREET
PHILADELPHIA

C. R. WE NAME PLATE and ENGRAVING CO.
CHICAGO ILLINOIS
Manufacturers of
Etched Name Plates
For Automobiles, Carriages and Machines
SKELETON RADIATOR SIGNS
DASH and SILL PLATES

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THE BOSSERT WAY

MEANS

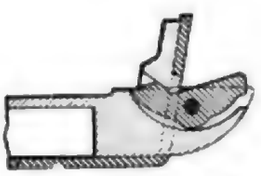
Over 200 Bossert Pressed Steel Parts

cover such a variety of requirements that there isn't a truck builder who cannot use some of them to advantage.

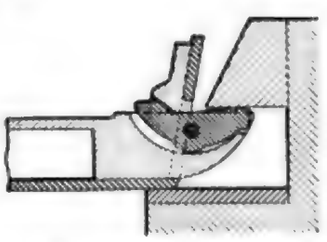
BETTER BUILT TRUCKS

Have your engineers consult with our experts on truck construction.

∴ THE ∴
BOSSERT CORPORATION
UTICA, N.Y.



Shows the extreme position of the expanding member and the latch bolt when door is open.



Shows the expanding member in contact with the inner bearing surface of the striker and having taken up all the clearance between it and the door stop when door is closed.

"SEARS-CROSS LOCK"

FOR AUTOMOBILE DOORS

"The Lock With the Expanding Latch"
(Manufactured under the Ottinger Patents)

It Prevents Rattling of Doors
Insures Positive Safety Protection Against Doors Opening Accidentally
Overcomes Present Difficulty in Opening and Closing Doors
and
Automatically Takes Up Wear

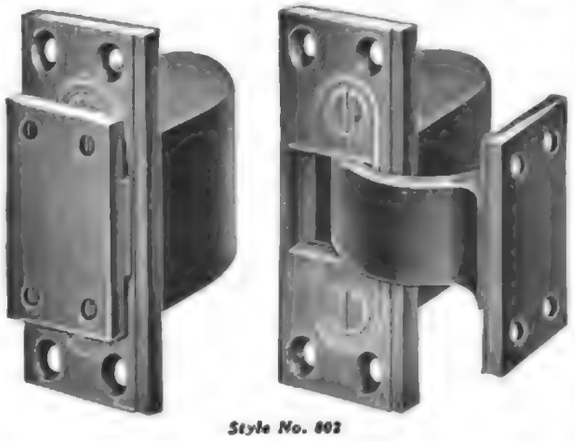
The outward pressure of the rubber stops is taken care of by the inward pressure of the Expanding Latch which holds the doors tight so that they cannot rattle. The holding pressure is supplied by the lock and not by the rubber stops.

The only perfect automobile door lock. Brings about economy in cost of installation. Made for all priced cars, open and enclosed bodies.

SEARS-CROSS CO.
Bush Terminal, Brooklyn, N. Y.

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About Concealed Hinges



Style No. 602

WE HAVE manufactured for years a Concealed Hinge with drop forged steel hook, and a drawn brass non-rusting case. One of our designs is shown in the accompanying illustration, and we desire to inform the trade that all Concealed Hinges we make are fully protected under U. S. Patents owned by us. We will protect all users of our Automobile Door Concealed Hinges, or for that matter on any other goods which we may manufacture and offer to the trade.

The English & Mersick Company
New Haven, Conn.

FLEXIBLE BORING MACHINE



PERFECTED

Prices and particulars sent on application.

Bores holes at any angle within a circle of twenty feet or more. USES A FLAT BELT. Has bearings of friction pulley covered, thus overcoming every objection made to the old machine, of which there are thousands in daily use.

STOW MFG. CO. BINGHAMTON NEW YORK

Chicago Office, 106 S. Jefferson St.

General European Agents
SELSON ENGINEERING CO.
88 Queen Victoria St., London, Eng.

The HOTEL TULLER DETROIT MICH.



Park, Adams and Bagley

Facing Grand Circus Park

CAFETERIA PAR EXCELLENCE—Self Service

MEN'S GRILL
Colored Waiters

ROSE AND CASCADE ROOMS—Colored Waiters

600 Rooms—$2.00 and Up

Two Floors—Agents' Sample rooms. New Unique Cafes and Cabaret Exellente

EDWARD SMITH & CO.

Carriage Varnishes

92 Years' Experience in Every Can

E.S. 1827 & CO.

CHICAGO NEW YORK

Pacific Coast Dealers:
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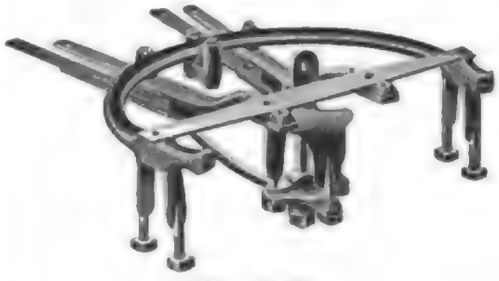
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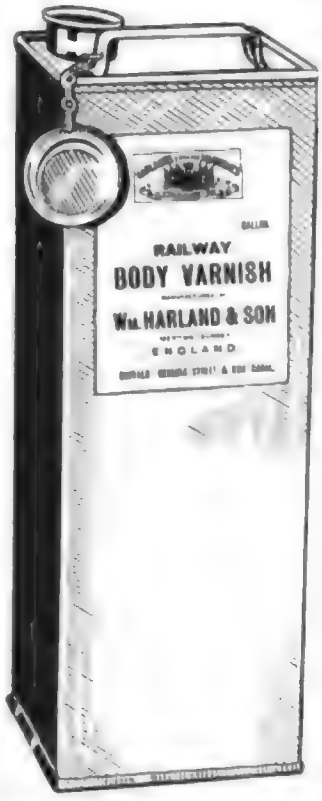
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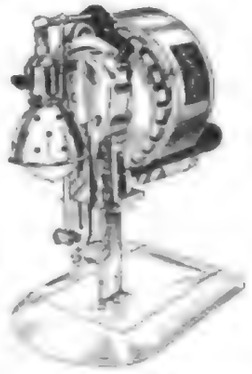
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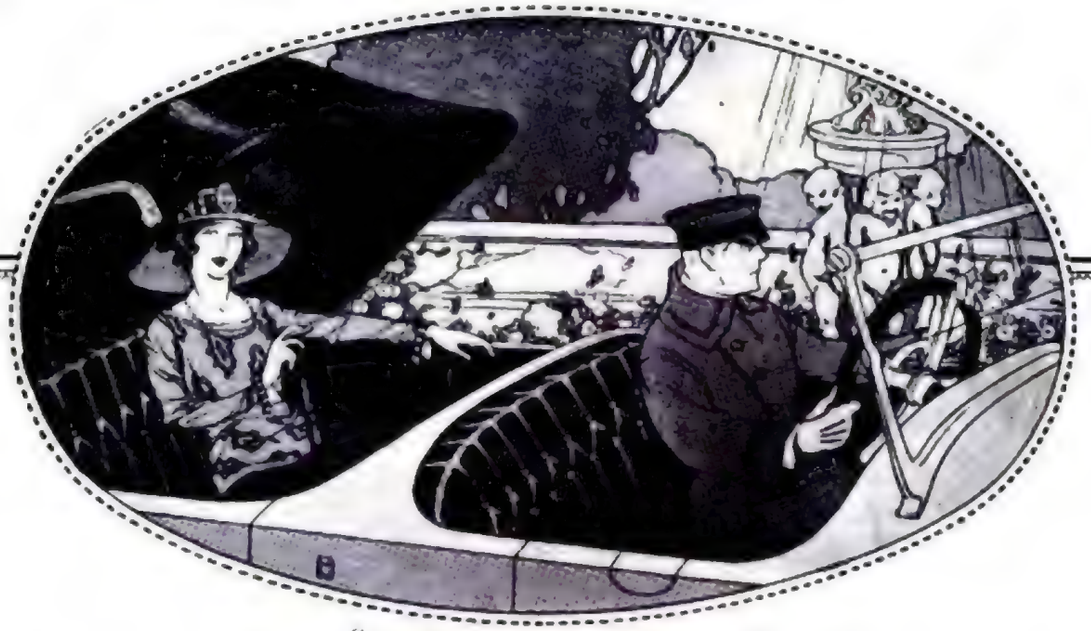
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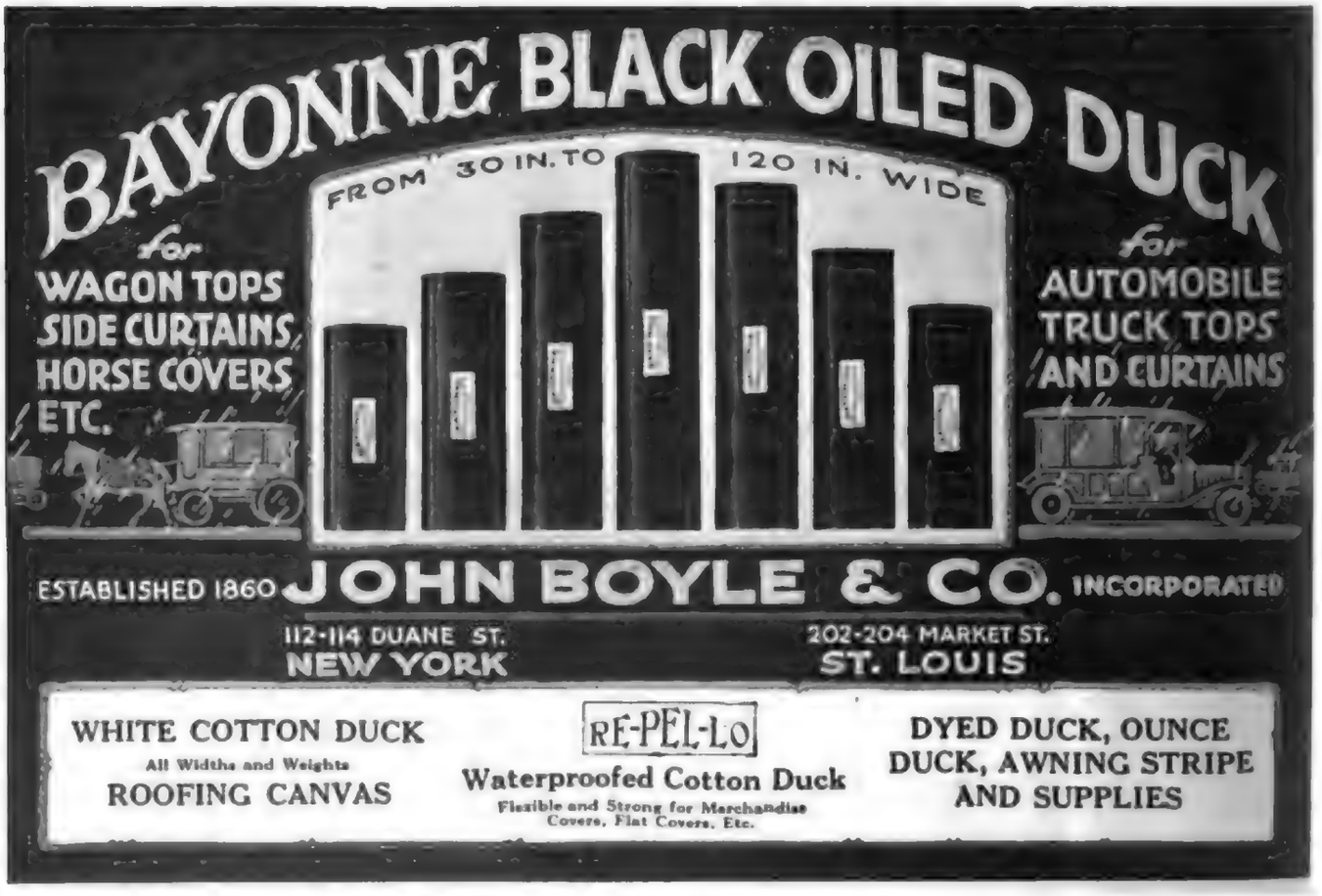
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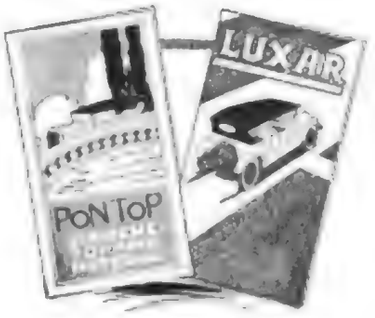
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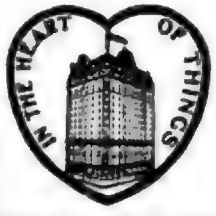
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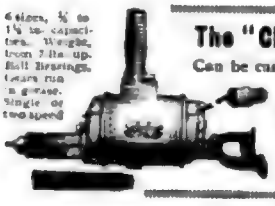
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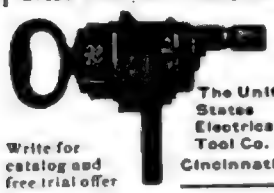
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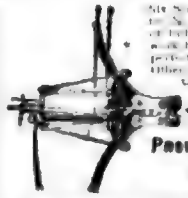
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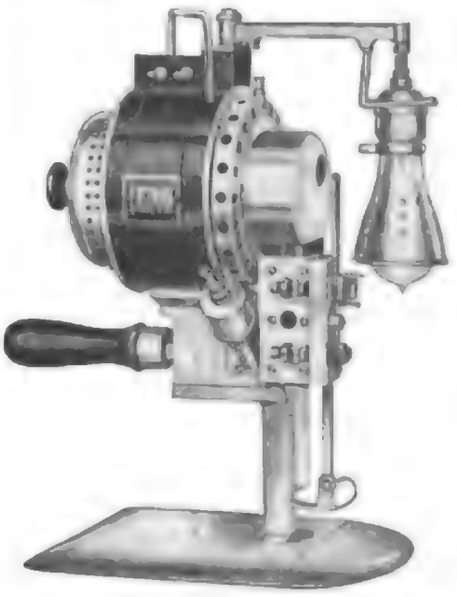
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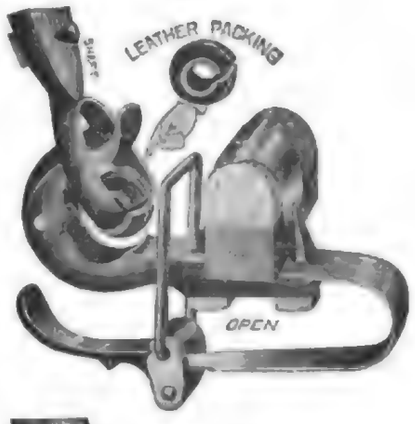
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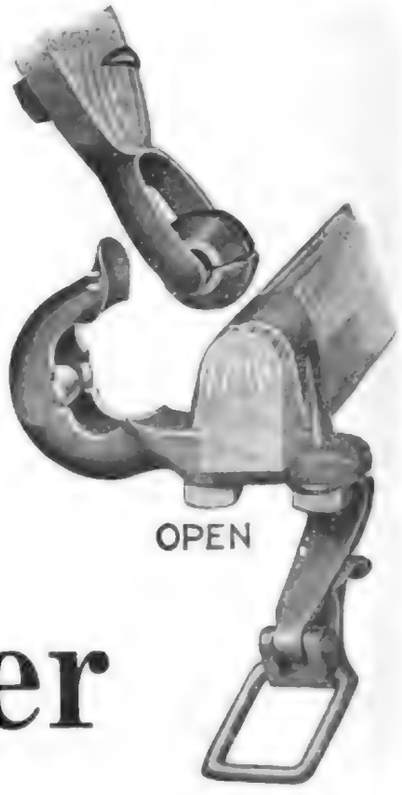
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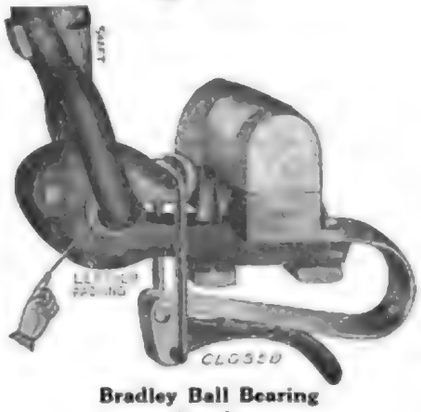


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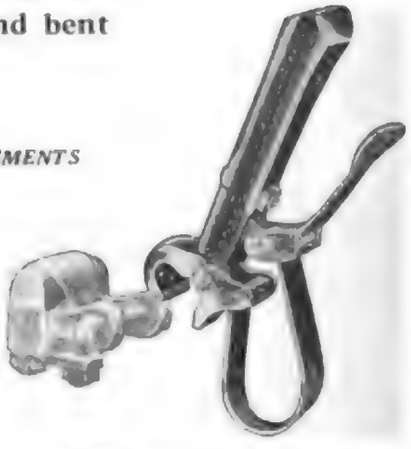
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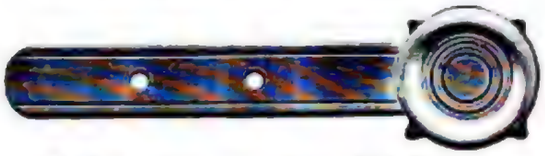
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VOL. 55—No. 7 OCTOBER, 1919

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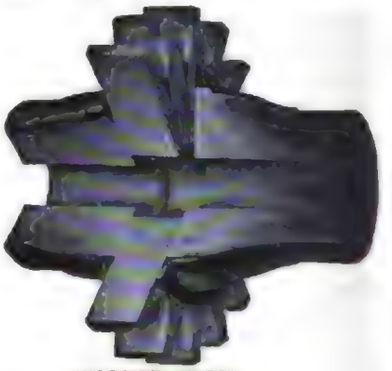
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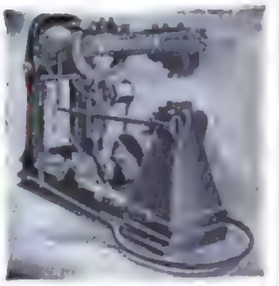
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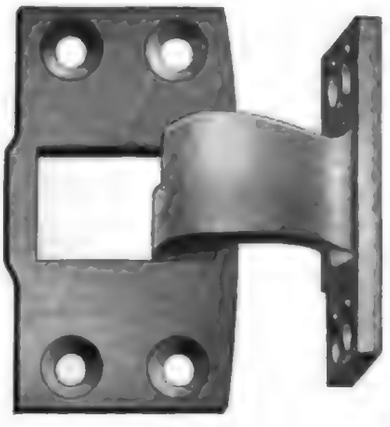
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PUBLISHED FOR 54 YEARS AS

THE MAGAZINE FOR VEHICLE MANUFACTURERS

Published Monthly by
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Advertising rates will be furnished on application. Copy for advertisements should reach us not later than the tenth of the month to insure insertion in the following issue. Changes in advertisements should reach us not later than the tenth of each month.

THE VEHICLE MONTHLY is a member of the A. B. C.

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The Vicious Postal Zone Law

By SENATOR ARTHUR CAPPER, Chairman of the Senate Committee on Expenditures in the Department of Agriculture, and Former Governor of Kansas.

It has been argued that the postal zone increases apply only to the advertising sections of magazines. This is perfectly true as a statement of the mere words of the postal zone law.

It is not true as a statement of fact.

For a periodical or a newspaper is a unit from cover to cover. It is one unit of bulk that is never broken. The argument that the increased postage merely affects advertising is virtually the same as if it were argued that the postal zone legislation had provided that the upper half of the magazine should pay postal zone rates and the lower half flat rates. It would be a mere bookkeeping separation that would not in the least affect the postage cost to the reader, for the reader—who is the ultimate consumer—takes the magazine as it comes, and the cost of the magazine is its cost as a unit, and its postage cost to him is its entire cost as a unit, no matter how ingeniously or intricately one may subdivide the component parts.

There is one other important factor, also, which I feel many sincere and ordinarily keen-minded citizens have overlooked, and that is, that the magazine and newspaper differ from every other commodity—if you wish to consider newspapers and magazines as merely commodities—in the fact that it is the only "commodity" that is sold to the consumer at less than its cost of manufacture! And a newspaper, trade paper or magazine is the only commodity of which this is true.

Take such a publication as the "Saturday Evening Post," for example. You cannot buy the blank paper that is used in a single copy at the mill for the price at which the entire copy is sold to you, with the additional expenses added of its printing, illustrations and with the works of the ablest and highest paid writers in its columns! This would not be possible without the advertising pages, as will readily be appreciated. So that the benefit of the less-than-cost-of-manufacturing price of the magazine goes to the reader not only in a pecuniary saving, but in its social, cultural and civic advantages.

Should we as patriotic, clear-thinking citizens do anything to make difficult the accessibility of our newspapers and periodicals? I think not.

I think as a matter of fundamental principles we should not. I am the more confirmed in this view when I see that the United States is one of the greatest reading nations in the world, that it has a national periodical press that has been one of the greatest factors in unifying its idealism from the Atlantic to the Pacific in the greatest emergency our nation ever faced.

We have only to think of such countries as China and Russia or a half-dozen other non-periodical and non-newspaper consuming nations to give us food for very serious thought in this matter of legislating repressively against the easy accessibility and wide circulation of one of the greatest educational instruments of modern civilization.

Now as to the advertising and whether it should pay a higher rate than the body of the magazine. I think I have answered half of that question when I point out that the periodical and newspaper is the only product that is sold for less than its cost of manufacture, and that this fact is made possible by the advertising. Advertising is nothing but a bulletin-board—the bulletin board of our economic, wealth-producing, business life.

Advertising is the one great factor in modern wealth production that enables wealth to be distributed almost instantaneously; a generation or so ago the same result could not have been accomplished without years of hand-to-hand selling and expensive, slow, personal salesmanship.

You, as a thinking citizen, know what any restriction upon advertising would do to the wealth production of this nation. Congress itself saw this, and when means of war taxation were being carefully discussed and every channel was being developed, it was deliberately decided that the destructive economic effects that would follow the taxation of advertising would be too great and too dangerous to attempt.

The difference between advertising and an ordinary economic commodity is, to my mind, this: that advertising is an idea, the germ of an idea, a thought; it is the economic, generating germ of infinite wealth-producing potential; it is, in itself, not wealth production, but it means the production of wealth by reaching possible consumers who otherwise would have been deaf, dumb and blind in their demands upon our national wealth production.

What the cultural, educational and stimulative reading pages are to the social and civic factors in our national life, just that is what advertising is to the economic and wealth-producing side of our nation. Both the editorial and the advertising pages are nothing but thoughts; they are the stimulations, the stimulative germs of an enormous creative potential in all channels of our civic and economic life. To me it is unsound policy that would attempt to limit or restrict the circulation of the stimulative thought throughout our nation on the ground of postal cost.

Now then as to the allegations of the cost of transmission of this second-class matter through the mails.

The figures upon which the absurd allegations of second-class deficits are made were compiled by the Post Office Department in 1908 and 1909—eleven years ago! So unreliable were they even then that when the U. S. Postal Commission, headed by the Hon

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Automobile Exports

That American exports of automobiles have increased to the point where during the past year one automobile was exported from the United States on the average of every nine minutes day and night, Sundays and holidays included, is shown by a detailed study of American automobile exports recently issued by the "American Exporter."

The average time elapsing between shipments of passenger cars was twelve minutes while the average between shipments of commercial cars was forty minutes.

These shipments mean that every minute of the day and night $264.26 was spent by foreign purchasers of American automobiles and parts, including tires.

Of this amount, $43.05 was spent every minute by foreign purchasers of American tires, while $5.43 was spent every minute on magnetos, spark plugs, etc.

The "American Exporter" has compiled an automobile census of foreign countries showing the estimated number of cars in all the principal foreign countries as of July, 1919. This estimate is based on the most recent information obtainable. In arriving at these figures, use was made of such sources of information as the official statistics of automobile registrations and licenses issued in various foreign countries, the import and export statistics of these foreign countries and the statistics of production of foreign countries which manufacture automobiles. While exact figures have not been obtainable in every case, it is believed that the figures below are approximately correct. The figures are as follows:

Automobile Census of Foreign Countries

ESTIMATED AS OF JULY 30, 1919

Algeria	5,000	India	4,500
Argentina	35,000	Italy	35,500
Australia	35,000	Jamaica	1,500
Austria	19,300	Japan	3,000
Barbadoes	700	Martinique	540
Belgium	12,000	Mexico	15,000
Bolivia	500	Morocco	1,100
Brazil	10,000	Netherlands	20,000
British E. Africa	900	Newfoundland	500
British Honduras	50	New Zealand	14,685
British S. Africa	11,500	Nicaragua	150
British Guiana	700	Norway	3,500
Bulgaria	1,000	Panama	560
Canada	300,000	Paraguay	100
Ceylon	3,500	Peru	1,500
Chile	8,590	Philippine Islands	9,750
China	1,500	Porto Rico	5,085
Cochin-China	950	Portugal	5,000
Columbia	1,000	Portuguese East Africa	150
Costa Rica	350	Roumania	2,500
Cuba	20,000	Russia	15,000
Curacao	150	Salvador	100
Denmark	7,500	Siam	1,300
Dominican Republic	1,000	Spain	14,000
Dutch E. Indies	12,000	Straits Settlements	3,200
Dutch Guiana	180	Sweden	10,000
Ecuador	400	Switzerland	6,140
Egypt	1,500	Trinidad	825
Finland	2,000	Tripoli	700
France	200,000	Tunis	500
French Guiana	100	Turkey	500
Germany	75,000	Uruguay	5,000
Great Britain	415,000	Venezuela	1,500
Greece	1,000	Miscellaneous, Asia and Africa	1,000
Guadaloupe	300		
Guatemala	300		
Haiti	265		
Hawaiian Islands	6,340		
Honduras	110	Total	1,384,250

In commenting on the growth of American automobile exports, it is pointed out that their total value, including both passenger cars and trucks, amounted during the fiscal year ended June 30 to $79,047,767, while exports of parts and tires amounted to $25,650,810.

The total value of automobile exports for the fiscal year ended June 30, was over two and one-half times that of the fiscal year 1914.

In the past fiscal year there were fifteen times as many commercial cars exported as in 1913, and their value was twenty-eight times as great.

The number of passenger cars exported during the year was forty-five per cent. greater than in 1914, and their value was eighty per cent. greater.

The increase in exports of automobile tires is almost as significant as that of automobiles, since the value of these exports during the fiscal year 1919 was over six times as great as in 1914.

Some countries spent almost as much during the past year in this country for tires as they did for automobiles. Thus in the case of Argentina, for every dollar spent in the purchase of automobiles, eighty-two cents was spent for tires, and for every passenger and commercial car exported to Argentina, approximately $1080 was spent on tires. Incidentally the value of Argentine purchases of American tires during the past fiscal year was eighty-three times that of 1914.

The value of our exports of tires to Brazil was 56 times as great as that of 1914. To Chile these exports were 106 times that of 1914. For every dollar spent by Chile for American automobiles during the past year approximately 70 cents was spent on tires.

The value of our exports of tires to the Dutch East Indies was 303 times that of 1914. For every automobile exported from the United States to the Dutch East Indies $304 was spent on tires.

In the case of British India the value of tire exports was 131 times that of 1914.

For Good Roads and Against Car Stealing

Concerted action directed toward the abatement of automobile stealing and the improvement of highways will be taken by the national associations representing owners, dealers and manufacturers, as the result of a conference held September 9, at the offices of the National Automobile Chamber of Commerce in New York City.

To curb car stealing they will ask for legislation in all States to protect car users and will urge that the Dyer Bill be passed by Congress, making it a felony to take a stolen car from one State to another, punishable by imprisonment of not less than two years nor more than ten. In the direction of obtaining better roads they will endorse the Townsend Bill and encourage everywhere permanent types of highways for motor vehicle use.

Another bill that will have their support will be the Volstead Bill, a prohibition measure which, through the efforts of the National Automobile Dealers' Association, has been amended so as to protect dealers who hold mortgages on automobiles confiscated for carrying liquor.

The contemplated co-ordination of effort was brought about by the growing insistence of automobile users everywhere for more uniform and effective legislation bearing on the needs mentioned. It was recognized by all present that duplication of effort could be avoided and the facts presented more clearly to the public through co-operation than through independent effort. It was also felt that in this manner legislators could be supplied with basic information which they desire now, but which has not been readily available in the past, as to the best means of procedure to gain the desired ends.

The conclusions of the meeting were that a conference committee should be formed of a representative and an alternate appointed by each association, and that this committee should draw up a plan of action and complete the details, following out the general scheme outlined at this meeting. The committee is to hold meetings at stated intervals to initiate campaigns to be conducted by each association independently through its members and others in the same field, enlisting the co-operation of the trade and daily and trade press.

A World Traveler

This office is in receipt of a letter from Louis C. M. Reed, at one time a valued editor of THE VEHICLE MONTHLY. He is now in Calcutta, India, but expects to be in the United States by January of next year.

During the last two years Mr. Reed has visited China, Japan, the Philippines, Straits Settlements, Java, Burma, Australia, New Zealand, Egypt and India. He will spend some weeks in further travel in Europe before sailing for New York.

Prior to his connection with this journal Mr. Reed had covered almost the same ground, but in addition spent some time in South Africa, Turkey and Persia.

During his lifetime Mr. Reed has visited thirty-five different countries of the world, besides virtually every State of the Union promoting American trade. He plans a six-months lecture tour upon his return to this country, after which he will again sail for foreign fields.

Demand for Trailers Very Active

Trailer manufacturers report sales much larger in volume than a year ago, with a steadily increasing demand. The makers have been very busy since the close of the war getting squared away for a new start. Many have moved into larger plants, erected new factories or otherwise expanded production facilities. Leading companies are doing several times the volume of business ever done before at this season. A number of new companies have been organized recently to manufacture trailers or have gone into the field from other lines, while established manufacturers are bringing out new and improved types or models. Every indication points to great activity in this industry, from this time forward.

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Change in Tax on Parts, Etc.

In Treasury Decision 2915, just issued, the Revenue Bureau has made a radical change in the method of handling the tax on tires, inner tubes, parts and accessories.

Under this decision the car manufacturer may now purchase *all* tires, inner tubes, parts and accessories tax free, the car manufacturer to pay the tax when he resells these articles.

If these parts, etc., are sold as components or equipment of a new vehicle, the tax is on the proper percentage of the selling price of the vehicle so equipped.

If the part, etc., is sold separately as a service or repair part, the tax is five per cent of the car makers' selling price. Thus the change is that instead of the parts maker paying the tax on repair parts, the car maker will pay it on the latter's selling price.

Also a new form of certificate is given. The car manufacturer should take prompt steps to see that this new certificate is used. This certificate may be printed on or attached to the purchase order or may be given to the supplier of the tires, inner tubes, parts and accessories each month, in which case it would cover all orders made during the month.

The same provisions apply to a maker of tires, inner tubes, parts and accessories, who purchases from a manufacturer articles which may be defined as automobile tires, inner tubes, parts or accessories.

Thus there is no double taxation. Each tire, inner tube, part or accessory may be sold and resold without tax so long as the purchaser is making the purchase in his capacity as a manufacturer of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts or accessories. The tax becomes due when the sale or resale of such articles is made to one who is not such a manufacturer.

But please note that there is *no* tax exemption when the part, etc., is sold by its maker to, say, a dealer or distributor, who in turn resells it to a car or parts manufacturer. In such a transaction the tax is still upon the maker of the article.

The decision reads as follows:

"*To Collectors of Internal Revenue and Others Concerned:*

"Article 14 of Regulations 47 entitled 'Tires, inner tubes, parts and accessories sold to manufacturers' is hereby modified to read as follows:

"Subdivision (3) of Section 900 of the Act exempts from tax, sales of tires, inner tubes, parts, or accessories to a manufacturer or producer of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts, or accessories. In order for the sale to come within the exemption of the statute, the vendor must also at the time the goods are shipped or sold (whichever is prior) have in his possession an order or contract of sale, with certificate of the purchaser in writing, printed thereon or permanently attached thereto, to the effect that the purchaser is a manufacturer or producer of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts or accessories; that he is purchasing the article in question as such manufacturer or producer for resale in some form or manner, or for free replacement under contract or guaranty; and that he will account to the Internal Revenue Collector and pay the tax on the sale of such articles, unless such sales by him are made to another manufacturer or producer of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts, or accessories for resale by him in some form or manner or for free replacement, in which case he will require the same form of certificate from such manufacturer or producer; that when such tires, inner tubes, parts or accessories are sold other than on, or in connection with, the sale of new automobile trucks, wagons, automobiles or motorcycles, he will pay the tax on such sales (unless made to a manufacturer or producer, or for free replacement under a contract or guaranty); that when such articles are sold on or in connection with the sale of such new vehicles he will pay the tax on the selling price of such vehicles, including such articles. Said manufacturers furnishing such certificate will be deemed manufacturers within the meaning of the law and subject to the tax imposed on sales of such articles by manufacturers, unless the sales are made to another manufacturer or producer of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts or accessories, for resale by him in some form or manner or for free replacement under a contract or guaranty, and who furnishes a certificate so stating. Following is a form of the certificate or statement which will be accepted, and in substance must be strictly adhered to:

FORM OF CERTIFICATE

"The undersigned hereby certifies that he is a manufacturer or producer of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts or accessories, and that the tires, inner tubes, parts or accessories purchased hereunder are purchased by him as such a manufacturer or producer for resale in some form or manner, or for free replacement under contract or guaranty, and agrees if any of the tires, inner tubes, parts or accessories are sold by him exempt from tax to another manufacturer or producer of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts or accessories for like purposes, he will require a similar certificate from such manufacturer or producer. The undersigned further agrees that in respect to all tires, inner tubes, parts or accessories sold by him, unless such sale is made to such a manufacturer or producer, he will pay the tax on such sale direct to the Internal Revenue Collector, including it in his tax return covering the month in which such sale is made; said tax to be paid on the basis of the taxpayer's selling price of such articles when sold other than or in connection with the sale of new automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts or accessories, and on the selling price of such vehicles or articles when the same includes such articles.

"If it is impracticable to furnish a certificate for each order, a certificate covering all orders between given dates (such period not to exceed a month) will be accepted. If in any case such an order and certificate cannot be produced on demand of any authorized agent of the Department, the tax in respect to the sale will be considered in default.

"So much of the provisions of Regulations 47, Treasury Decisions 2852, 2860 and 2893, as relates to the sale of 'tires, inner tubes, parts or accessories' are, in so far as they conflict herewith, hereby revoked.

"*Approved September 3, 1919.*"

The Trailer on the Farm

Many farmers and fruit growers are finding the trailer and semi-trailer one of the most useful pieces of farm equipment. The light two-wheel and four-wheel, high speed trailer is used with runabouts and touring cars for hauling small quantities of farm products to market which otherwise would go to waste or be fed to livestock. Too much time would be lost if these small lots were taken to market with horse and wagon, but a round trip to town with the family car and a trailer loaded with a few hundred pounds or half a ton can be made in a couple of hours or less. Produce handled in this way includes milk, butter, eggs, live poultry, fruit, vegetables and even live pigs, calves and cows. The car is used at other times without the trailer for all customary purposes.

This use of trailers appeals to the women members of the farmer's family because it avoids the loading of boxes, crates, cans, etc., in the tonneau of the car, with consequent marring of the finish, scratching and tearing of the upholstery and soiling of the interior generally.

Semi-trailers are used extensively where there is more and heavier hauling to do. Loads of two to three tons are carried on semi-trailers with runabouts and touring cars. The rear deck of the runabout or the body of the touring car back of the front seat is removed and a fifth-wheel device bolted into the frame over the rear axle. The front end of the semi-trailer is attached to and supported by this fifth wheel. Weight of the load is thus divided between the automobile and the two wheels of the semi-trailer. The trailer is detached whenever desired and the car used for errands or pleasure driving.

Small farmers find that trailers and semi-trailers, used with their automobiles, often serve all their hauling needs. Says a cattle breeder in Arizona who has hauled a two-wheel trailer 15,000 miles behind his light runabout and has not had an outlay of more than $15 on the trailer:

"I have carried cows, calves, bulls up to a ton weight, lumber, grain, large trees, wood, coal and many other things used on my farm. Such a vehicle is indispensable to me and I think should be generally used by farmers."

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Charles E. Hughes, investigated them two years after their compilation, they were officially discredited as being no indication of what the costs were for the various divisions of second-class matter! Moreover, the Post Office Department since that date has taken pride in stating that it has in enormous and basic ways cheapened the postal cost of second-class matter.

The most unfortunate part of this postal zone legislation is that it is an insidious and dangerous attempt to set back postal history seventy years and re-establish the universally condemned principle of postal cost determining the postal rates. It abolishes the sound postal principle of equal postage to all parts of our nation. The rural free delivery—one of the most vital and important postal functions—is conducted at almost a total loss, and if this vicious and unsound cost principle is once established the demoralization of our splendid postal principles is only a matter of logic and time.

Commissioner Urges Uniform Laws

Fear that ill-considered motor truck legislation by the different States will interfere with the development of economical highway transportation and of motor truck express service in interstate commerce has led the New York State Commissioner of Highways, Frederick S. Greene, to write to Colonel Sherrill, of the U. S. War Department, calling attention to the necessity of having the States of the Union enact uniform traffic legislation.

The Commissioner points out that New York State is preparing for the motor express era and is building concrete roads as parts of its program in promoting motor truck lines. The State Division of Foods and Markets is much interested in the development of such truck operation as an important factor in promoting agricultural production and reducing prices of farm products in the cities. "It will be the duty of the next legislature," says Mr Greene, "to enact laws that will promote transportation development."

In his letter to the War Department the Commissioner says:

"I have noticed that a great many States are now beginning to enact motor truck legislation, and, as usual, the laws are not uniform. This, of course, is going to hamper not only the manufacture of motor trucks, but will tend toward confusion generally in motor truck traffic. I believe the law should limit motor trucks in three directions: width, height and maximum load per inch of bearing surface of tire. In my opinion, no truck should be allowed on our highways which is more than 8 feet in width and 13 feet in height."

He also advocates a maximum gross weight of vehicle and load not exceeding 800 pounds per inch of tire, as the crushing strength of concrete pavements average 3,600 pounds per square inch. This gives a factor of safety of nearly four, which is enough to take care of stresses due to impact of heavy moving vehicles. He does not anticipate any trouble with regard to length of trains composed of tractors and trailers, as he believes that grades of more than 5 per cent. limit them at present to one or two trailers hauled by a single tractor.

The recommendations as to weight per inch of tire and over-all width made by the New York State Commissioner are the same as those in force in Massachusetts and several other States. They have been agreed upon by the motor truck industry as reasonable and sufficient for protection of properly constructed highways, and are embodied in a uniform traffic bill that has been prepared for introduction in the various State legislatures next winter.

Production and the H. C. L.

The prospect of every American having a fair share of the things necessary to sustain life and make it worth living, depends in part upon the speed and quantity in which those things are produced. If we were able for a certain length of time to devote the whole of our productive powers to making useful things and nothing else, their cost would be reduced (in spite of the machinations of the profiteer) to a price which would enable everyone to have all required.

It is obvious that the wage earners of the country constitute the chief market to which producers must look for the purchase of the goods produced. In the main, it is necessary that we produce for ourselves and for others such things as we require, such as food, shelter and clothing. If a sufficiency of such things were produced, their prices would fall to a level where all might obtain what their necessities demanded.

The cheaper these things become, the less they take up of the wages of the workers, the more money is freed for the purchase of other things and a demand is created for fresh commodities. This demand furnishes further employment and additional wages. So this cycle continues to revolve indefinitely around production. By increasing production the cost of living not only is decreased but employment is augmented and money is liberated to command less necessary things.

If we do not adopt every means of increasing output, if we do not abolish waste and diminish unnecessary expenditure, we must gradually impoverish ourselves as a nation. Unless we give a larger share of our national effort to production of necessities and save on luxuries that more capital may be released for plants and machinery for further production, conditions will be produced which will tend to lower the general standard of life of the wage earners in spite of higher nominal wages.

But, if we are prepared to work hard, to spend wisely, to save regularly, to cut down waste and extravagance and invest securely, shorter working hours will become possible, wages will be really and not nominally higher and national prosperity will be our reward.

One of the greatest aids to the furtherance of thrift is the consistent and regular investment in Government savings securities.

How They Do It in England

The following article, taken from "The Automobile and Carriage Builders' Journal," London, England, will furnish a picture of the typical English body shop, and will illustrate some of the troubles that afflict the plant superintendent. Happily for us, most American factories move along with considerably less "heart breaking" than seems to be the case "over there."

The Works Manager

There is no occupation more arduous than that of the works manager, especially in the moderate-sized factory. He, if to be successful, must be a good administrator and have a real knowledge of all the practical details of the various departments he is called upon to supervise. After many years' experience in the shops he is singled out for his responsible post by reason of his energy and knowledge. Probably he has already risen to some degree of foremanship in his own special department, and, a vacancy occurring, he applies for it, and in due course finds that overseeing is a really strenuous job, calling forth all his powers every moment of the working day.

Of first importance, and one on which the firm will judge him chiefly, is the ability displayed in getting the work out. He must keep a keen eye on the work in progress, see that the priming coats are applied as soon as the body is sufficiently advanced, see that the trimmer is keeping abreast of the job, and at some stage of the job, not always at the most convenient moment, see to the mounting of the body on the chassis. Sometimes the chassis arrives so that the bodymaker can build on it straight away at the bench; on other occasions this has to be done in the paint shop, as the body has got as far as the first coat of color.

The chassis has a direct influence on one of the greatest problems the foreman has to deal with (giving the labor question, naturally, first place), that of shifting the jobs from one department to another. The chassis provides an easy means of moving the job about, and if it is not available at the right moment it means wasting valuable time, although plenty of body horses are useful as a compromise, but what shop has ever enough plant of this character? It needs the capacity of a field officer to so marshal the work that no needless moving about of it is entailed. It is a heart-breaking job to have to pull out half-a-dozen bodies in order to move a seventh. The ideal factory is so planned that the work can go straight through a shop and out at the other end. But we are afraid this is not always the case.

The works manager must be ready for all emergencies. A job may be hung up for a special fitting, which was ordered in good time, but can only be obtained from one firm. He has then to provide a fresh job for the man at the bench; the next job which ought to be done may not suit the particular temperament of the bodymaker concerned, so he has to be given the next body awaiting con-

(Continued on page 56)

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

IX. REAR AXLE REPAIR

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

Rear axle repair and maintenance are not exceptionally difficult providing certain special equipment is at hand and fundamental rules are followed. And rear axle jobs appear with sufficient frequency to merit some little special study of method and equipment.

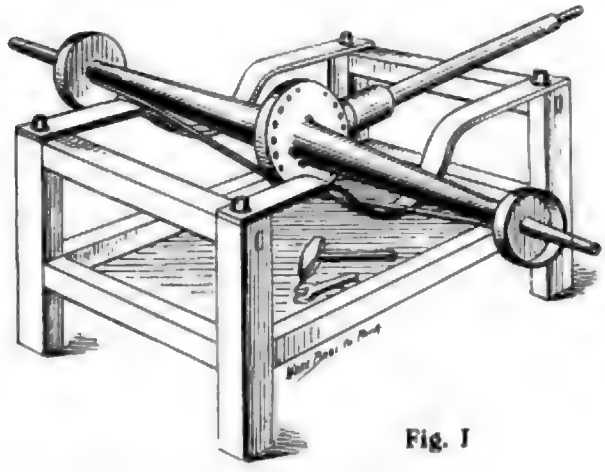


Fig. I

Methods of Handling Car

Before the rear axle can be removed it is necessary to raise the weight of the car completely from the axle. Ordinarily jacks are not considered safe, as when a car is supported from beneath, it may tip and fall onto a workman, or at least injure the car. Hence the use of a chain fall or portable crane is considered better practice, though at such times as the car is not being worked upon, blocking may be used to support it. And blocking should always be used as an extra safeguard from accident.

Rear Axle Stand

As has been repeatedly stated in this series of articles, an essential to efficient work is some suitable means of holding the assembly being worked upon so that all parts are accessible.

For rear axle work the stand shown in Fig. 1 is simple to construct and will handle most passenger and light truck axles. This stand consists of a wooden framework built of 2 x 4 inch pine, bolted together.

Heavy strap iron members bolted lengthwise along the top, and bent downward in the center on a radius, provide a rest for the axles, and the end pieces support the drive shaft. As the axle may be readily turned over, all parts are accessible. And furthermore the wheels may be fastened on and all necessary adjustments made.

It is present-day practice to provide wheel pullers as part of the regular equipment of each car; but in some cases the puller is not available or is not powerful enough to remove an obstinate wheel. In such cases, or when a large amount of work is done on one make of car, a special make of puller, similar to that shown in Fig. 2 is advisable. The jaws of this puller should be forged U-shape, and fitted to slip over the hub and engage at the neck inside of the hub cap threads. These jaws are prevented from spreading by a strap iron reinforcement riveted across the two sides. The threaded spindle should carry a fine thread, which is made a loose fit in the jaws, and the point should be case hardened to prevent flattening. The value of the loose thread is that after a strain has been applied, a sharp blow with a hammer causes the most obstinate wheel to jar free.

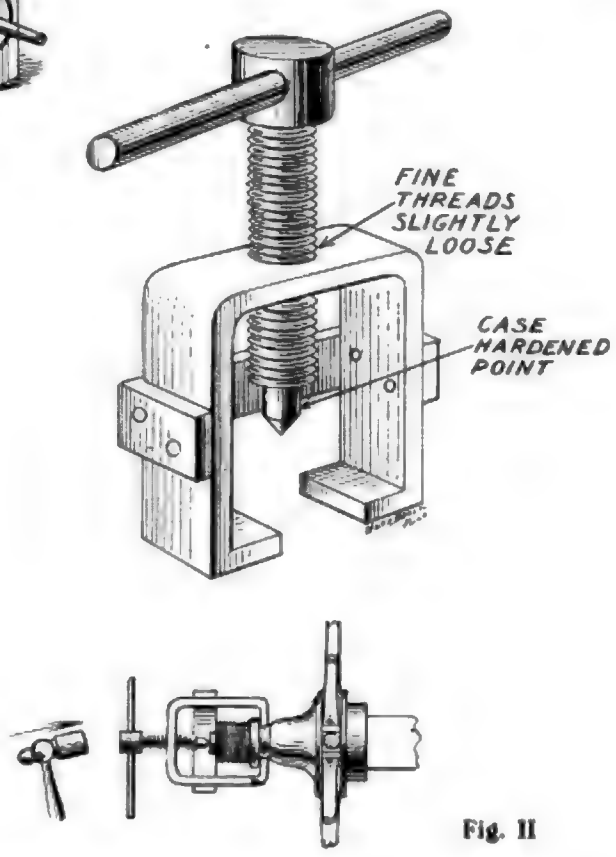


Fig. II

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Removing Truck Wheels

Truck wheels are exceedingly cumbersome to handle and as in all truck work, mechanical aid is necessary. To remove a truck wheel, the hub cap and wheel locking device is removed and the axle lifted free from the floor by means of a chain fall. A special truck dolly, as illustrated in Fig. 3, is placed beneath the wheel, and the wheel pulled or forced free from the axle. Once free, the weight is taken by the dolly and the wheel may be drawn free from the axle. The assembly is the reverse of the removal.

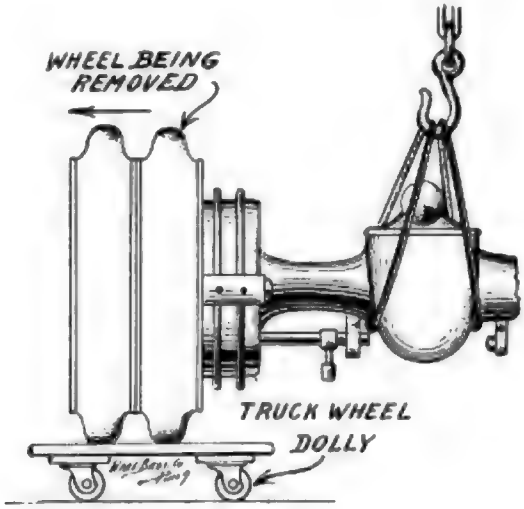


Fig. III

Indications of Trouble

In case of the presence of any of the following indications of trouble, the axle should be removed from the car, torn down, cleaned, worn parts replaced and the axle reassembled with readjustments:

1. An excessive humming or grinding, indicating that the gears are worn, broken or badly adjusted.

2. A catch occurring at frequent intervals, indicating the possibility of a broken part coming between the gear teeth.

3. Failure of the axle to operate.

Road Test Adjustments

Certain adjustments are of course possible without tearing the axle down. For example, a certain amount of humming or grinding caused by improper setting of the pinion and ring gears can be removed by adjustments and road test.

The method here is to drive the car to a level road, and accelerate as quickly as possible to 30 or 40 miles per hour. The clutch is then thrown out, and the car allowed to coast until it stops. Now, if the car seems to pick up speed "heavily," but coasts freely, the pinion and ring gears (see Fig. 4) are too closely adjusted. If, however, the pickup is free, but the coast "heavy," the pinion and ring gears are not far enough in mesh. By means of the adjustments shown on Figs. 4 and 5, the gears should be so placed that both the pickup and coast are free.

Removing Axle From Car

The first step in removing the axle from the car is to block the front wheels. So doing may later save the car from rolling off the blocking and on to a workman or some fragile part, providing the chain fall has been removed.

As described on the preceding pages, the rear end of the car is swung free from the floor, preferably on a chain fall. The drive shaft, brake rods and spring are then removed, and the axle drawn out to the rear. The car may then be let down onto blocking until time to reinstall the axle.

The axle should then be placed on the axle stand, shown in Fig. 1, and the hub caps removed. The wheel puller shown in Fig. 2 is then used to remove the wheels. (Oftentimes parts are rendered more accessible by removing the wheels before taking the axle from the car, and so doing has the added advantage of permitting removal of the axle without lifting the car high enough for the mudguards to clear the wheels.)

As will be seen in Fig. 4, the next part to remove is the pinion gear housing, brake rods, etc. After this the bolts holding the two rear axle halves together are removed and the housings drawn apart.

The Inspection

The various parts should be carefully washed in kerosene. All ball and roller bearings should be examined to see that they are not pitted or checked, and the races are in good condition. If one ball of a ball bearing is found defective, or the race is checked or rough, an entire new assembly is advisable—for a slight irregularity in a ball bearing will cause abrasions that are difficult to detect, but may later cause trouble.

Long service or improper adjustment and lubrication may cause the gear teeth to become worn or burred. A slight amount of wear will cause noisy gears; and if this wear is so great that objectional noise cannot be sufficiently reduced by adjustment, the gears should be replaced with new ones.

The fastening of the gears to their respective shafts and flanges should next be examined. The rivets holding the ring gear to its flange should be tight. A slight amount of looseness here may be removed by reheading the rivets, but the best practice is to remove the rivets, ream out the holes and hot rivet new oversize rivets in place.

In doing this work, it is a good plan to catch the differential housing in a lathe; center the main bearings, and see if the ring

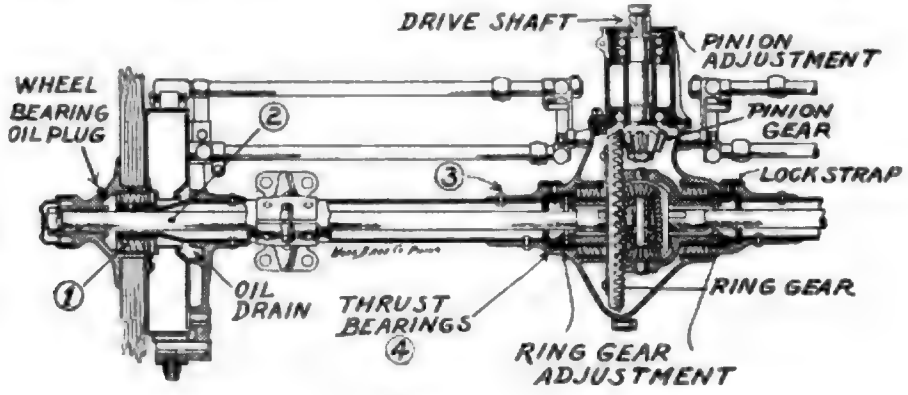


Fig. IV

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gear flange face is true. If it is not, the ring gear will be warped when it is riveted in place and will alternately bind and be free when mated with the pinion. The remedy is to remove irregularities from the flange.

On assembly, the parts should be set as near as possible to their original positions. The gear teeth should be carefully cleaned, and a thin coating of Prussian blue applied to the teeth of the pinion gear.

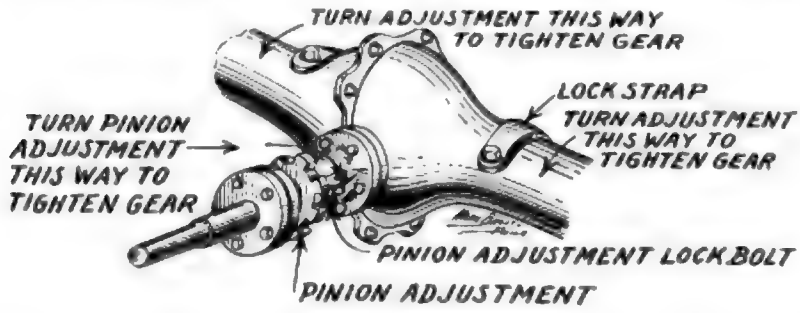


Fig. V

The gears are then turned around several times; the pinion gear removed and the teeth of the ring gear examined. The gears should mesh *full across* their faces, and *evenly* all the way around. If they do not mesh evenly, either the ring gear is warped, or the pinion gear not true. Further examination should locate the trouble. The method of correcting for a warped ring-gear flange has been noted—but warped gears usually mean new gears.

For a typical rear axle, the method of adjustment to correct too great or too little meshing is shown on Fig. 5. When properly adjusted, the gear should turn freely all the way around and have a barely perceptible backlash.

The reassembly is the reverse of tearing down, and the adjustment should be checked up by a road test, as described, for "heavy pickup" and "heavy coast."

Automotive Screw Thread Practice

The matters upon which the National Screw Thread Commission, recently created by Congress, has been working are of fundamental importance to the automotive industry. The commission has recently issued a progress report of its work, tentative recommendations being made therein as to screw, bolt, nut and pipe thread standards, classification of fits, allowances (prescribed differences in dimensions, the limits of which are prescribed), and tolerances (definite differences in dimensions prescribed).

The commission is constituted of nine members. The chairman of the commission is the Director of the Bureau of Standards. The Army and the Navy have each designated two representatives. The four remaining members of the commission were named by the Society of Automotive Engineers and the American Society of Mechanical Engineers. The act establishing the commission defined as its purpose the ascertaining and establishing of standards for screw threads for use of the various branches of the Federal Government and for use of manufacturers.

The Commission has made a creditable report on systems of threads, together with information, data and specifications pertaining to the manufacture of the threads recommended.

Too much emphasis cannot be put on the fact that the specification and maintenance of proper manufacturing tolerances in any factory have everything to do with attaining economical production and quality of product. It has been recognized that as a class the automotive shops of this country are unexcelled in their work. The automotive manufacturers should and will exercise all vigilance to improve their fine record in this respect. General conditions including competitive manufacture for international consumption, if no other reason, necessitates this.

At the request of the screw thread commission, the Society of Automotive Engineers held a meeting this week for the purpose of securing the best information of a comprehensive nature as to what is most desirable in screw thread practice in the automotive industry. Reports were made on the work of the National Screw Thread Commission, and data secured during the recent visit of the commission to Great Britain and France were submitted. The meeting, at which President Charles M. Manly of the Society presided, was representative and of great value. Among those present were Morris Thomson, Timken Detroit Axle Co.; Paul W. Abbott, Lincoln Motor Co.; Lyle K. Snell, Willys-Overland Co.; R. P. Smith, Packard Motor Car Co.; W. A. Davidson, The Singer Mfg. Co.; Alexander Taub, General Motors Co.; Wm. Beckman, Duesenberg Motors Co.; Calvin W. Rice, Secretary, American Society of Mechanical Engineers; E. H. Ehrman, Chicago Screw Co.; W. R. Porter, S. S. White Dental Mfg. Co.; C. M. Pond, Pratt & Whitney Co.; A. W. Erdman, Pratt & Whitney Co.; E. C. Peck, Lieut.Col. Ordnance Department, U. S. A.; Earle Buckingham, Pratt & Whitney Co. and Niles, Bement & Pond; B. H. Blood, Pratt & Whitney Co.; L. A. Fischer, Bureau of Standards; J. B. Thomas, Westinghouse Electric & Mfg. Co.; W. K. Jamison, The Domestic Engineering Co.; L. P. Kalb, Standard Parts Co.; E. Burdsall, Russell, Burdsall & Ward Bolt and Nut Co.; C. F. Clarkson, General Manager, Society of Automotive Engineers, and R. S. Burnett, Standards Manager, Society of Automotive Engineers.

It was decided at the meeting that in order to accomplish the most of value to the automotive industry and to secure the best consensus of opinion for the consideration of the National Screw Thread Commission or any other similar body, the best procedure would be to gather from representative manufacturers in practical shop form definite information as to present practice. When all is said and done, the minutia of screw thread practice are among the most obscure things in industry, and while the present time knows the advanced stage in this connection, there is still room for great improvement, speaking generally. The Society of Automotive Engineers is assured of the support of the manufacturers in its field and has enlisted the services of men of excellent training and long practical experience in screw thread and shop work, to act as its committee to direct the collection and analysis of the industrial data mentioned. This committee consists of Paul W. Abbott (Chairman), Lincoln Motor Co.; R. P. Smith, Packard Motor Car Co.; Lyle K. Snell, Willys-Overland Co.; Alexander Taub, General Motors Co., and W. K. Jamison, Domestic Engineering Co

The Malleable Castings Association

When an industry, by the concerted effort of its members, evidences a determination to establish a high standard of quality for its product, it is but natural that considerable interest should be aroused. But when such determination is expressed by a body of men representing so many distinct organizations as those composing the great malleable industry, the importance and difficulty of the task is at once recognized.

This in brief was the responsibility which the American Malleable Castings Association assumed at the time of its organization. And its recent announcement of the course pursued and the results obtained is an interesting commentary on its most commendable activities.

Aside from the various laboratories of its members the association maintained at Albany a research department for investigation and experiment, and for the testing and analysis of the daily output of each member of the association. Impartial tests were made and the results, together with direction for improvement, where the need was indicated, were forwarded to the respective members.

So successful has the work of the association proved that today it is credited with bringing all its members to a high average quality in their product known as "malleable castings."

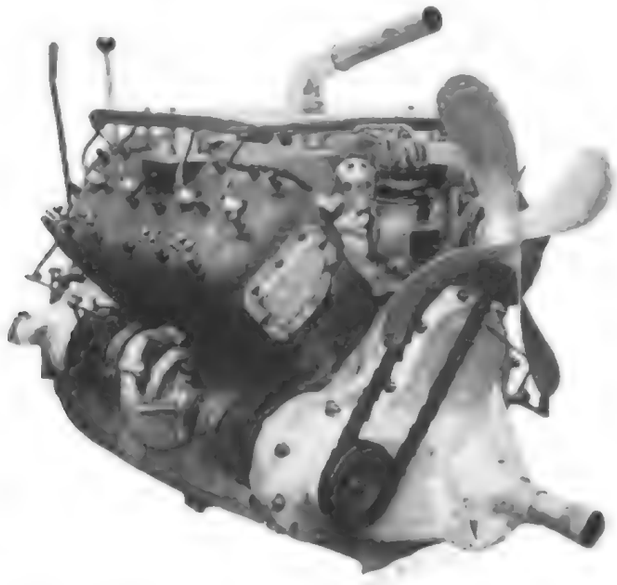
Having accomplished that result the association, it is said, will continue these daily tests and analyses for the purpose of grading the product of each member. When a member's product has daily met the requirements of the prescribed standard for a period of three months a "certificate of quality" will be issued to that member, who may designate his output as "certified malleable castings." These certificates will be renewed quarterly where the quality required is maintained

(Continued last column, next page)

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"More Power Than You'll Ever Need"

The Daniels Motor Car Company, Reading, Pa., furnish the following specifications of the Daniels "Eight" Engine, for which the manufacturers have adopted the slogan: "Just a little more power than you'll ever need." In passing, we may remark that this company, in addition to producing an excellent motor, is also turning out some very well designed bodies. One of these, a sedan, is shown on another page, while a roadster style is illustrated below.



Daniels "Eight" Engine, of which specifications are printed on this page.

Daniels Engine Specifications

Engine—Eight cylinders, V type, L head, 3½" bore, 5¼" stroke. Displacement, 404". Cylinders cast en bloc, four each. Intake manifold cast integral, exhaust manifold bolted on. Detachable head. Aluminum crank case. Lower half separable, acting as oil reservoir. Helical cut timing gears, generator and water pump chain driven. Single cam shaft, with intergral cam for each valve. Connecting rods, side by side on crank pins. Two-bolt cap construction. Bronze backed bearings. Three point power plant suspension. Steel fly wheel. Large diameter, quiet operating valves. Valve adjustment accessible in the alley between the cylinders. All parts fully covered. Large aluminum fan, belt driven. Large and accessible oil filler and breather. Pistons and connecting rods removable by dropping lower crank case. Light weight, well balanced reciprocating parts, sturdy chrome nickel crank shaft. S. A. E. rating 39.2 H. P. Actually develops 90 H. P.

Cooling—Cellular type radiator, distinctive design. Circulation by centrifugal pump. Positive circulation to each cylinder block.

Lubrication—Pressure feed to all bearings. Regulated by adjustable safety valve. Spur gear oil pump located in lower half of crank case. Self-priming. Oil passages drilled in crank shaft, feeding oil to all bearings, including cam shaft. Oil filter at pump allows only clean oil in pressure lines. Oil pressure gauge on instrument board.

Carburetor — Zenith duplex carburetor, single float chamber, single air inlet, joined to two separate and distinct spray nozzles, venturi, idling adjustments, butterfly valves and outlet flanges. Located at top of engine, between cylinder blocks. Fixed adjustments that cannot wear, give uniform and maximum results. Auxiliary air control to facilitate starting, operated from instrument board.

Ignition—Delco distributor in connection with Willard 6 volt 145 amp. hour storage battery and Delco generator.

Starter—Delco starting motor equipped with mechanical gear shift, positive and quiet. Entirely enclosed.

Generator—Delco 6 volt generator. Charging current automatically regulated. Single wire system, ground return.

Malleable Castings Association

(Continued from page 13)

At the same time the association is issuing a booklet on malleable iron and its production which will prove very interesting to those who desire a better understanding of the methods employed in the improvement of malleables. The book can be obtained by any of our readers without charge by writing to the American Malleable Castings Association, 1900 Euclid Building, Cleveland, Ohio. The Association will take special pleasure in sending this booklet to manufacturers of wagons, motor trucks, passenger cars and carriages, all of whom are users of malleables.



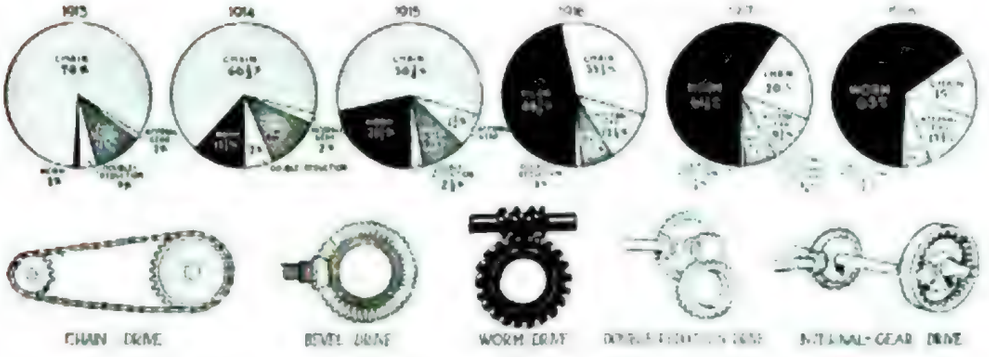
ROADSTER BODY MOUNTED ON DANIELS CHASSIS.
Built by The Daniels Motor Car Co., Reading, Pa.

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Rowe
THE PIONEER WORM-DRIVE TRUCK

Did We Design Right?

THE FOLLOWING CHART GIVES THE ANSWER



OTHER manufacturers, seeing how splendidly the Rowe performed, quickly became ardent exponents of the worm drive, with the result that in five years it was used on 65% of American trucks.

We especially emphasize this feature of Rowe trucks, because we deem it a particularly strong selling point.

Don't fail to read further interesting facts on next three pages

ROWE MOTOR COMPANY
LANCASTER, PA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

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Rowe



IF we could demonstrate to you the many units of national reputation used in Rowe trucks; if we could acquaint you with the careful assembling and have you witness the exacting tests Rowe trucks must endure, then you would cease to wonder why Rowe dealers get the business.

There's a type for every service—
2, 2½, 3, 3½ and 5-ton capacities

ROWE MOTOR CO.

LANCASTER, PA.

These Factory Views Show

1—Driving Wheels
2—Chassis Assembly Department
3—Making Channel Steel Frames
4—An Avenue of Rowe Trucks
5—A Corner of the Big Machine Shop



ROWE RUNS RIGHT

ROWE RUNS RIGHT

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The High Spots in Rowe Motor Truck Construction

ENGINE:—

On Pneumatic 3-Ton Model, 50 H. P. Herschell-Spillman. On other models, 4-Cylinder Wisconsin.

AXLES:—

Sheldon. Rear axle of housing type with David Brown worm gear. Worm special steel, heat treated, with hardened differential gears. Roller and ball bearings used throughout.

SPRINGS:—

Sheldon. Rear, semi-elliptic type, so slung as to minimize all road shocks.

STEERING GEAR:—

Ross. Irreversible, of the worm and nut type.

TRANSMISSION:—

Brown-Lipe. Four speeds forward and one reverse. Gears special triple heat treated.

IGNITION:—

Bosch high tension magneto.

CARBURETOR:—

Zenith.

Catalog gives further details—ask for it

ROWE MOTOR CO., LANCASTER, PA.

5-TON ROWE WITH METAL DUMPING BODY



ROWE RUNS RIGHT

ROWE RUNS RIGHT

Rowe
THE PIONEER WORM-DRIVE TRUCK



PLENTY OF POWER makes the Rowe reliable for all kinds of roads and all kinds of weather.

It is recommended for country as well as for city service.

The Rowe can be depended upon to get over the top of any hill.

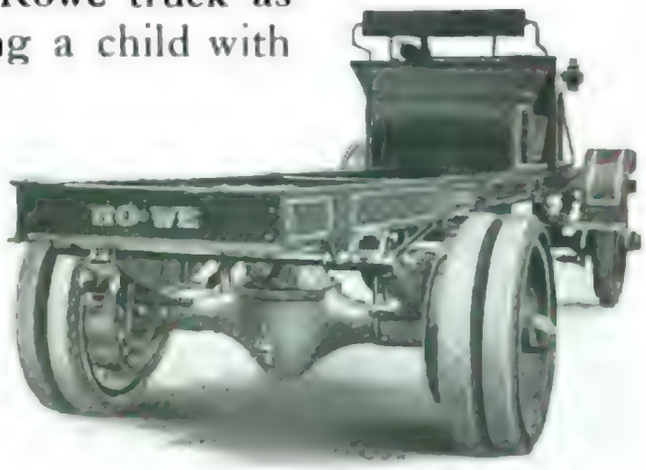
It is a fool-proof, trouble-free truck that sells at a real reasonable figure considering its superb construction.

Dealers, you can be as sure of pleasing a customer by selling him a Rowe truck as you are of pleasing a child with a new toy.

Write for the large Rowe catalog and our very attractive agency proposition.

ROWE MOTOR CO.

LANCASTER PA.



REAR VIEW OF 5-TON MODEL
We also make 2, 2½, 3 and 3½-ton trucks

ROWE RUNS RIGHT

ROWE RUNS RIGHT

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"Vehicle Monthly" Time Savers

"The Vehicle Monthly" will appreciate the receipt of any "Time Saver" made by its readers.

A rough sketch and a short description are all that is necessary.

(This series of "Time Savers" was begun in February, 1919. Back numbers may be had from the publishers)

"Vehicle Monthly" Time Saver No. 41
UNIVERSAL SOCKET WRENCH

There are many nuts and bolts that are inaccessible to the ordinary wrench. Oftentimes these may be removed by a special universal socket wrench comprising the usual socket connected to a T-handle through a small universal joint. By means of this the handle may be offset to avoid interference and the wrench turned in the usual manner.

"Vehicle Monthly" Time Saver No. 42
INNER TUBE ROLLER

In the vulcanizing room the usual method of preparing tubes for delivery is to remove the valves and roll the tube by hand to expel the air, after this the valves are replaced This rolling may be quickly accomplished on a special roller. This roller is a wooden wheel, turned by a crank and fitted into two pins, one central and one offset. The tube is placed as illustrated and by turning the wheel the air is expelled.

"Vehicle Monthly" Time Saver No. 43
SEPARATOR FOR USED OIL

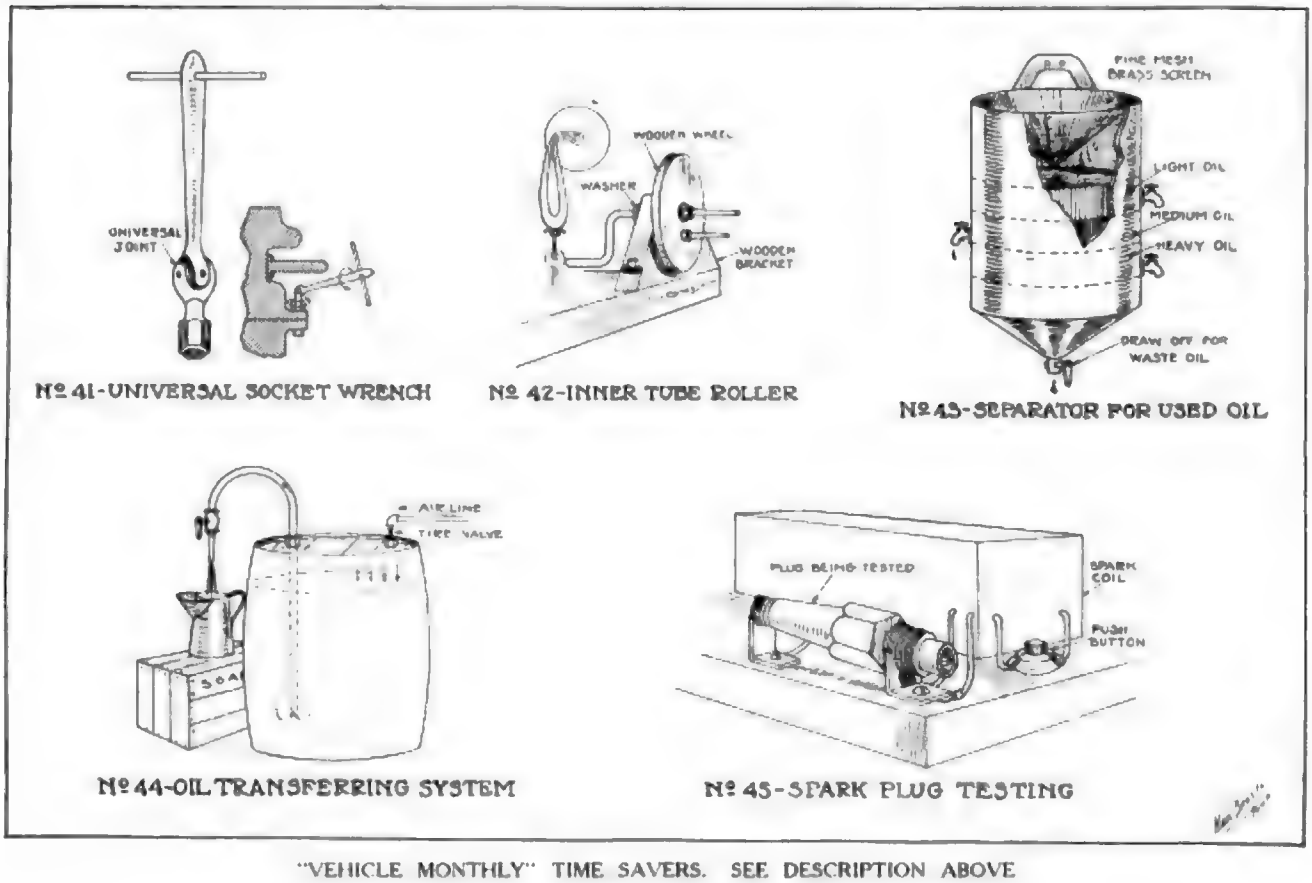
Old oil removed from crankcases is usually worthless for further engine lubrication, but by proper treatment is quite satisfactory for lubrication of machinery having less exacting requirements. The treatment comprises placing the old oil in a deep container having draw-offs at frequent intervals down the sides, and at the bottom The heavier parts settle and clear oil may be taken from the side draw-offs.

"Vehicle Monthly" Time Saver No. 44
OIL-TRANSFERRING SYSTEM

Many garages find the use of air pressure in transferring oil from the barrels to the measure satisfactory. By this method a U-tube is inserted through a bushing into the oil barrel, and air pressure is applied to the oil through the ordinary inner tube valve from an air pressure line. One feature of this system is that oil may be readily transferred from a basement to the ground floor, leaving the more valuable space free for storage or work.

"Vehicle Monthly" Time Saver No. 45
SPARK PLUG TESTING

Spark plugs may be tested by means of a spark coil and batteries connected to metal rests in the manner shown. The rests are two pieces of flat steel bent up and shaped to support respectively the plug terminal and shell. To these the secondary leads of the spark coil are connected and the primary circuit is made to the batteries through a push button. Short circuits, defective electrodes, etc., can be determined quickly by means of this test outfit.



Nº 41-UNIVERSAL SOCKET WRENCH

Nº 42-INNER TUBE ROLLER

Nº 43-SEPARATOR FOR USED OIL

Nº 44-OIL TRANSFERRING SYSTEM

Nº 45-SPARK PLUG TESTING

"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ABOVE

Instructions for Installing Gill One-Piece Piston Rings

Courtesy Gill Manufacturing Co., Chicago.

The important part which the piston ring plays in motor performance makes it essential for the rings to be fitted to the piston with the most exact care.

The first step in installing a new set of piston rings is the cleaning of the grooves in the piston. This can be done with a small screw driver the blade of which is narrower than the groove itself. Every particle of carbon should be carefully removed by scraping same from the grooves. It is also necessary that the grooves be thoroughly cleansed with kerosene or gasoline, so that no small particle of carbon will remain. This process of scraping the carbon from the grooves in the piston is illustrated in illustration No. 1.



1

Small ridges occasionally wear at the back of the ring groove. These can be removed with a lathe, but where no lathe is available, this trouble can be overcome by making a slight change in the piston ring as follows: Take a file and rub it slowly around the inner edge of the ring—the edge which comes in contact with the ridges at the back of the groove, removing enough material in this manner to allow the ring to fit into the ring groove without touching these ridges.



2

Each ring should then be separately tested in the ring groove in which it is to be placed to see that it fits the groove properly.

Where a piston ring is loosely fitted in the ring groove, there is constant danger of lubricating oil getting behind the rings and then traveling to the combustion chamber, resulting in the formation of carbon.

Extreme care is required in getting the proper fit of the rings to the groove, as shown in illustration No. 2. The ring should not



3

wabble or have any great amount of play as it is run around in the ring groove. Extreme care should be taken to see that the wall thickness of the ring is not greater than the depth of the ring groove. Therefore, the inner edge of the ring should not extend above the edge of the piston, as shown in illustration No. 2.

The testing of the ring in the ring groove should be performed after the rings have been tested for proper size and clearance, as illustrated in illustration No. 3. When testing rings in a cylinder, as above explained, there should be a clearance at the joint of the ring equivalent to .003 of an inch for every inch of the diameter of rings. For instance a 4 inch ring requires an opening at the joint of .012. After they have been allotted to the various cylinders they should then be marked for cylinder and piston Nos. 1, 2, 3 or 4, according to the cylinder in which they are to be placed, and then test the ring in the ring groove to be absolutely certain that the ring fitted to the cylinder is likewise fitted to the proper piston. This is to overcome the possibility of improper fitting if there is any difference in the size of the various cylinders.



4

Illustration No. 4 shows the use of skids in fitting the ring to the ring groove; skids are necessary when piston rings are to be slipped over the piston head into the proper groove. These skids are made either from pieces of hack saw blade or thin strips of metal. The purpose of these skids is to enable you to slip the ring easily over the top grooves, as the case may be, into the lower groove. One skid is placed at the back of the ring and one close to the joint on each side, these hold the rings in such a position that they can readily be moved down into the proper groove. In illustration No. 5, the mechanic is shown compressing the joint of the ring tightly, so that the piston will slip easily into the cylinder. Carelessness at this particular stage of the work is often responsible for broken piston rings and it is no rare thing to see a mechanic attempt to drive the piston in with a block of wood and hammer or to strike the piston rings themselves in an effort to close them at the joint so that the piston will slip in more easily.



5

If the above instructions are carefully followed, the piston and ring should enter the cylinder without any difficulty.

Due to slight variations in the width of ring grooves, it will occasionally be found that the ring is slightly too tight or wide for the groove for which it is intended. This difficulty can be overcome by the use of a piece of fine emery cloth tacked to a flat surface. The ring should be gently rubbed with a circular motion on this emery until the proper amount of material has been removed.

Cole to Make 6,500 Cars This Year

On August 25th the Board of Directors of the Cole Motor Car Company, of Indianapolis, Ind., declared to all stockholders of record a dividend of twenty per cent., or $20 on each share of common stock which has been issued by the company. During the present year the company anticipates a total production of 6,500 motor cars. Its entire production is devoted exclusively to the manufacture of one chassis—the "Aero-Eight"—and it is offered with nine different styles of bodies.

Barley to Make Roadster Bodies

The Barley Motor Co. is equipping a special custom body department and hereafter will manufacture all special bodies for its roadsters. Eventually the company hopes to expand its body building work to cover the manufacture of bodies for all its models, but for the present it has contracted for its 1920 supply of regular touring car bodies.

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BODY DEPARTMENT

VEHISOTE:

Efficiency
General Satisfaction
Economy



This handsome body with Vehisote panels is mounted on a Packard chassis.
Built by G. A. Schnabel & Sons, Pittsburgh

VEHISOTE SIDE PANELS

Over 70,000 closed panel bodies with Vehisote side panels now in service, each speaking a good word for Vehisote.

Vehisote is not a substitute for wooden panels. It is a scientific and positive improvement over wood or any other material for the purpose.

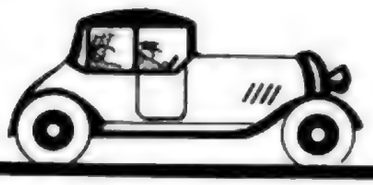
It is as far ahead of the old-fashioned methods as gasoline or electric trucks are ahead of the horse-drawn wagon.

THE PANTASOTE CO. 11 Broadway NEW YORK — Peoples Gas Bldg. CHICAGO — Penobscot Bldg. DETROIT

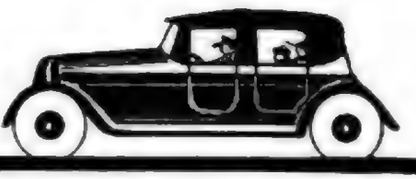
JOBBERS

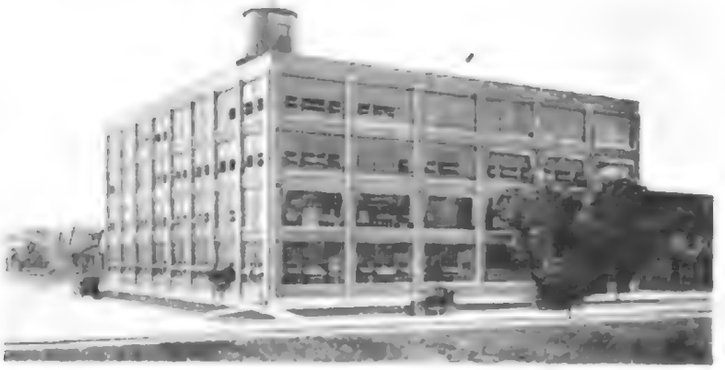
The Scovel Iron Store Co., San Francisco, Cal.
Sligo Iron Store Co., St. Louis, Mo.
E. D. Kimball & Co., Chicago
E. C. Kadow & Co., Chicago
E. J. Coyle & Co., Chicago
C. H. Tiebout & Sons, Brooklyn, N. Y.
N. Langler & Sons, Brooklyn, N. Y.
H. D. Taylor & Co., Buffalo, N. Y.
W. E. Kleine & Co., New York City
H. Hett & Sons, New York City
W. T. Crane Cge. Hdwe. Co., Newark, N. J.
Gerhab & Ludlam, Philadelphia, Pa.
John C. Hills, Trenton, N. J.
Moasman-Yarnelle Co., Fort Wayne, Ind.
Wm. Stockhoff, Louisville, Ky.

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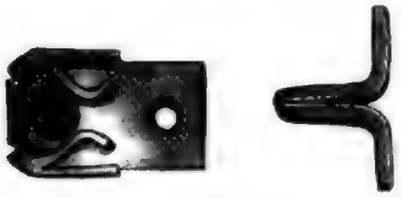
Closed Body HARDWARE





Where Ternstedt Closed Body Hardware is Made

In placing your next year's requirements for closed body hardware, you want to satisfy yourself that you will get deliveries. We have a new plant with 65,000 square feet of floor space, modern in every way, and are in a position to take care of your requirements.



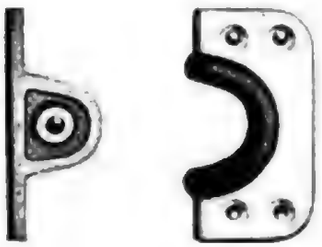
1120
Light Dove-Tail Bumper



1130
Lower Sill Bumper



1131
Upper Sill Bumper



1100
Combination Dove-Tail and Bumper

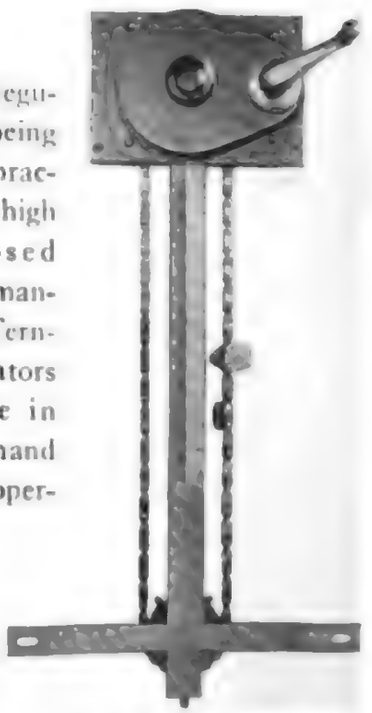


1115
Large Door Bumper



1110
Small Door Bumper

Ternstedt Regulators are being used in practically all high grade closed bodies now manufactured. Ternstedt regulators are simple in construction and positive in operation.



Standard Regulator

Door Bumpers which eliminate all rattle in doors. An absolute necessity in all closed bodies, and the cost is so small that no manufacturer can afford to let bodies go out unless equipped with Ternstedt Bumpers.

We manufacture Curtain Rollers, Anti-Rattlers and other closed body hardware, and invite the trade to send for blue-prints and samples

TERNSTEDT MANUFACTURING COMPANY

ARTILLERY AND MUSTER AVENUE :: :: DETROIT. U. S. A.

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Motor Bodies and Parts

Philadelphia Motor Body Builders

The regular monthly meeting of the Carriage, Wagon and Motor Body Builders' Association of Philadelphia were resumed on the evening of Friday, September 19, following the summer vacation. The attendance was rather above the average.

President William T. Dunbar occupied the chair. Secretary Henry F. Keachline read a lengthy report on the different phases of the revenue laws and their application to the vehicle trades, which was followed by discussion and the recital of individual experiences of body builders with the revenue people.

The feature of the evening was an address by a representative of J. D. Wallace & Co., Chicago, manufacturers of special woodworking tools for automobile, truck and wagon builders. Two of the machines were exhibited and their advantages explained by the speaker. His claims were more than backed up by several members of the local association, who have some of the machines at work in their shops. They testified that the tools were great time and labor savers.

Edward Preisendanz, of Camden, N. J., gave an interesting talk on present day conditions in the vehicle industry, furnishing a number of points that set his audience thinking. President Dunbar supplied some additional remarks along the same lines.

At the conclusion of the meeting the usual monthly dinner was served, the menu for the September affair consisting almost exclusively of delicious sea foods, including clam chowder, oysters, fish and deviled crabs.

Safety First in the Factory

Increasing attention is being given the subject of safety from accidents in mills and factories. Some people are unkind enough to say that the mill owners are goaded to install safety devices by workingmen's compensation laws. Be the reason what it may, the fact remains that accidents are decreasing due to precautions that are being taken.

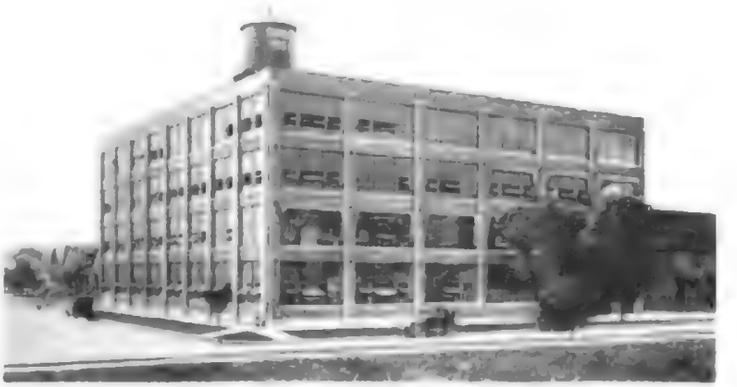
One of the simplest and cheapest guards against accidents was one of the last ideas to be thought of. That is generally the case. The simplest devices are looked upon with contempt just because they are so simple.

In many plants the worker who stands at a place on the floor some distance from the windows is in semi-darkness. Eye strain develops. He cannot see things clearly without puckering his brows. The heavy lines between his eyes become chronic, and he becomes a source of peril not only to himself but to everybody who works near him. There comes a day when he does not see quickly enough—and a limb is caught in a machine or a weight crashes down upon a man. Darkness has collected its inevitable toll

Even a factory that possesses an ample number of windows may be poorly lighted. The problem in lighting is not so much the amount of light as its proper distribution. A flat white, eggshell white, or gloss white paint is the simple remedy for such conditions. It may be applied on wood, iron, plaster, brick, or concrete.

Where Ternstedt Body Hardware Is Made

In our last issue, on page 48, we described a window regulator, made by The Ternstedt Mfg. Co., Artillery and Muster Avenues, Detroit. This window regulator enjoys widespread popularity and is used in many of the high grade closed cars.



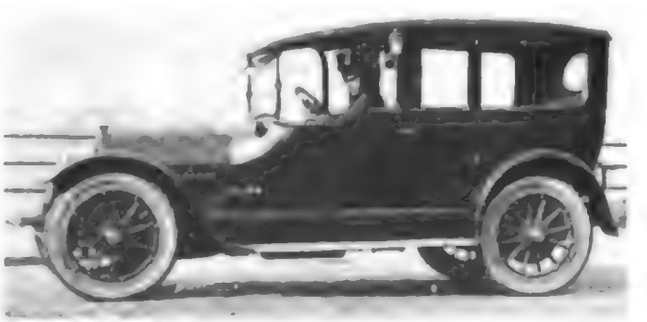
New Plant of The Ternstedt Mfg. Co., Detroit, Mich.

The same company also manufactures a complete line of closed body hardware, including curtain rollers, anti-rattlers, door bumpers, etc., as well as their standard and special window regulators.

In placing your next year's requirements for closed body hardware you will want to satisfy yourself that you will get prompt deliveries. The new plant of the Ternstedt Mfg. Co. in Detroit is evidence that this company is in a position to take care of any requirements, handling the largest orders as well as the moderate sized ones with the ease that comes from perfect equipment and enormous manufacturing facilities. The new plant, which is shown in the picture, has 65,000 square feet of floor space.



Custom Built Town Car of Tasteful Design.



A Rich and Beautiful Limousine.

TWO EXCELLENT SPECIMENS OF CLOSED BODY WORK FROM THE SARGENT & HAM CO., BOSTON, MASS.

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Working Draft of Seven-Passenger Sedan Body

Fitted to Daniels Motor Car Company's Chassis

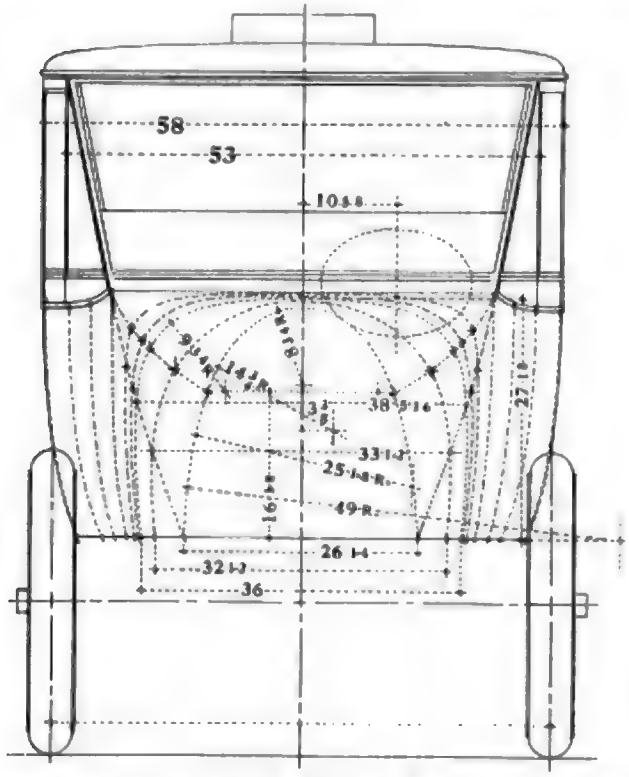
This chassis has a wheelbase 132 inches. The space from front of dash to center of rear wheels is 96½ inches; diameter of tires 34 inches; width across tires front and rear, from centers, 56 inches. Width across front of frame, 30 inches, and across rear of frame, 40 inches.

The length of the body is divided as follows: Length of cowl from hood joint to front door joint, 24 inches; width of doors, and lock door joint 57¼ inches, and across rear hinge door joint, 58 inches. Amount of turn-under 4⅞ inches, without molding.

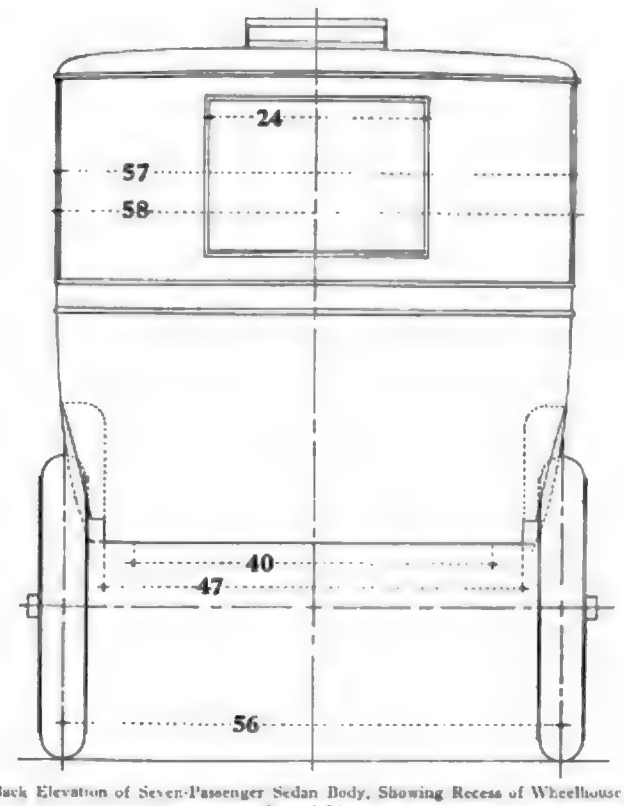
Laying Out the Lines and Points to Combine Hood With Body

To combine the hood with the cowl so as to produce an artistic finish is not always feasible, because the shape and widths of the hood cannot be made to harmonize with as on side elevation, the number depending on the shape of hood and cowl, on side elevation and bottom view. The half front elevation is produced by squaring the points from side elevation into half the front elevation, and by taking the various widths on half top view and carry them over to half front elevation. This can also be done by placing the half or full front elevation on bottom view in front of the hood, but in this case all the heights of hood, cowl and body must be carried from side elevation to bottom view.

Let us consider the sectional lines 1, 2 and 3 first, and the shape of hood on side



Front Elevation of Seven-Passenger Sedan Body, Showing Angular Front and Lay-out of Hood and Cowl with Complete Dimensions.



Back Elevation of Seven-Passenger Sedan Body, Showing Recess of Wheelhouse in Dotted Lines.

front and rear, 28 inches, and size of pillar between 1½ inches, and length from rear hinge door joint to extreme rear end of body 41½ inches, making a total length of 123 inches.

The height of body from under surface of sills to lower edge of belt rail molding is 25¾ inches; from lower edge of belt rail molding to top of fence rail, 4⅞ inches; from top of fence rail molding to extreme height of top, 25 inches; making a total height of 54⅛ inches.

The Widths of the Hood, Cowl and Body

The cowl, across front edge on frame, is 26¼ inches, across rear edge on frame, 36 inches; 15 inches above the frame, on dash joint, 38⅜ inches.

Width across lower edge of inclined front 43¾ inches. Width across top edge of inclined front, 52 inches; width across front door joint 53 inches; width across hinge

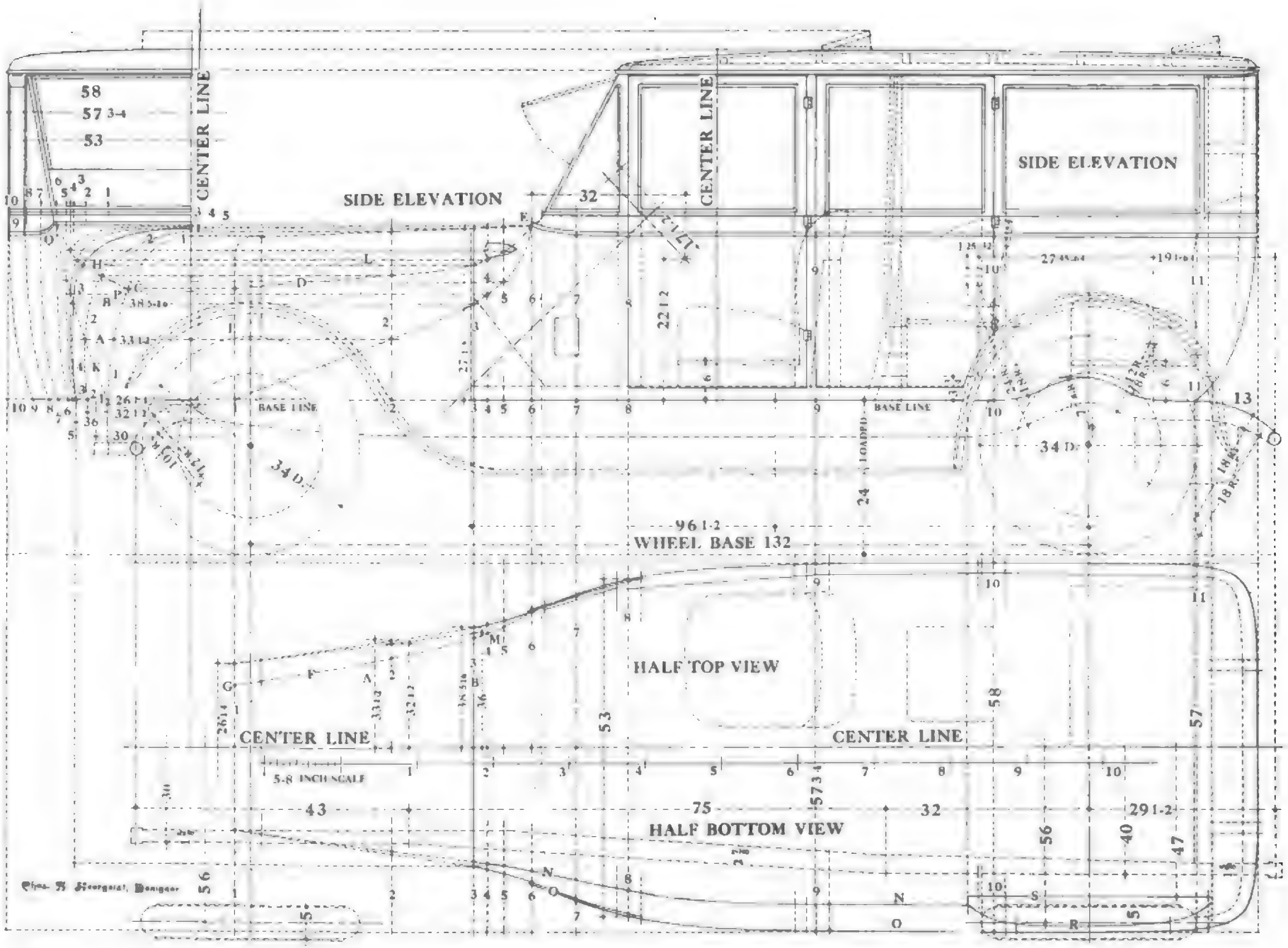
the outlines of the cowl and body. In such a case the hood is separated by a dash against which the hood is fitted, and body is fitted against rear surface of dash; but such a practice has been discontinued years ago on automobile bodies, and the object in view since has been to combine the hood with the front part of body to produce an artistic finish for both hood and cowl. The shape and widths of this hood are specially designed to give the cowl the best possible design.

To combine the two we give the outlines on side elevation and also on front elevation of hood and cowl where the two are jointed, where both must have the same curve on front elevation. The front end of curve is shown only half, divided by a center line, as is done in practice, shown on half front elevation. Line 1 is the front end of hood; line 2, twenty-five inches from front end of hood, and line 3 the rear end of hood.

These lines are called the "section lines," and front elevation, as these lines must invariably be the guide in making a suitable combination of hood and body. Dotted line 1 on half front elevation represents 1 on side elevation and bottom view. The same is the case with 2 and 3, half front elevation. Line 3 on half front elevation is a heavy line, corresponding with heavy line 3 on side elevation and heavy line on bottom view.

All the widths on this draft on half front elevation and half bottom views and half top view are given in the entire width across the hood, cowl and body. For instance 26¼ inches is the width across front of hood on section line 1. The width of 32½ inches is the width across bottom of hood on section line 2. 32½ inches is the width across A, on front elevation and half top view on section line 2. 36 inches is the width on section line 3 across bottom on both half front elevation and half top view. 38⅜ inches is the width on section line 3 across widest part

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WORKING DRAFT OF SEVEN-PASSENGER SEDAN BODY FITTED TO DANIELS MOTOR CAR COMPANY'S CHASSIS.

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of hood B, on both half front elevation and half top view. The above are the chassis engineer's dimensions given as a body builder's guide in fitting the cowl part to rear end of hood. Now we have to continue the same rule to obtain the shape of hood and body and the lines and widths marked with points are shown on side elevation, half front elevation, half top and half bottom view.

On half width on C, half front elevation, from center line to front curve of hood 1 carry line to point G, on section line 1; carry line C, half front elevation, over to front edge of hood on side elevation, and from that point start line D and continue it up to point E on side elevation; also make line F on half top view, starting from point G, half top view, which is taken on line C from center line to 1, half front elevation. These two lines D and F must correspond with each other. If either one has not the right curve and the right position the draftsman will discover the error by carrying the points from side elevation to top view and side elevation to bottom view. This is the same with the curves of those lines. If one has too much curve or not enough, or any of these lines are irregular, the draftsman will find this out by comparing line D, side elevation, with F half top view; and lines H and K half front elevation with all the widths across the hood and cowl. To show this by illustration, note line H half front elevation, which is irregular; in other words, line H has a break from point on curved line 3 to curved line 4 on point C. Compare this line with the same line on front elevation on a separate cut, which will give the idea exactly how the lines should be made to obtain well formed cowls in the easiest possible way.

The draftsman must bear in mind that the sectional lines 1, 2, 3, 4, 5 and 6 on side elevation must be carried down vertically into the top and bottom views, and this must also be done top and bottom on half front elevation as all those lines must intersect each other.

So far we have explained only sectional lines 1, 2 and 3, including widths, which complete the hood and front edge of cowl only and which have been produced by the chassis engineer. Now we will take up sectional lines 4, 5 and 6. Square over line L from point 4, intersecting with line D, side elevation to dotted turn-under and hood line, curve 4, half front elevation. Take half width from center line on sectional line 4 to point M, half top view, through which line F passes, and carry that half width to half front elevation from point 1, and center line, intersecting with line H and line 4, which is the turn-under line and upper cowl curve.

This line 4, half front elevation, is produced with patterns, but we at least must have 4 points which give the correct widths. To do this proceed as follows: Take half width on section line 4, intersecting with point on line N, half bottom view, and carry it to point on center line intersecting with base line to point 4, which is the amount of turn-under on section line 4. The next point is on section line 4, half bottom view from point 4 intersecting with line O to point on center line. Carry this half width to half front elevation from center line on horizontal line F intersecting with the turn-under line 4 and line K. Take half width on line 4, half top view from center line to point M, intersecting with line F, and carry it over to half front elevation to center line intersecting with line L, to line H intersecting with turn-under cowl, curve line 4. The next and last point is started on point 4 top of cowl, side elevation, and squared over in a horizontal direction to center line of half front elevation.

From these four points the curve 4 on half front elevation is made. To make it more complete another line like H, half front elevation, or two to three lines, can be produced by the same method. We only produce line H to show the very simple method of obtaining this line. This method is similar to all laying out of curved surfaces in body building and ship construction, which the carriage and automobile body builders are familiar with, and consequently it is easy for them to build bodies according to this method. Section line 5 is obtained same as 4 and 5 and needs no explanation.

The half width of section line 6 is taken on section line 6 from points on N and O half bottom view, and carried over to half front elevation on base line and fence rail line. The shape of the turn-under line is produced with the door pillar pattern by shifting it to produce the shape for the amount of turn-under. Line H then is extended up to the molding 5 to 6, half front elevation, to Q. This point Q is carried over in a horizontal direction from E, side elevation. Point Q is then connected with line H at intersection with line 6. If one or more lines are wanted as line H, they can be found by the same application of lines as with line H. To produce line K, half front elevation, start at Q, which represents section line 6, pass through 5, 4 and 3 points, and from 3 to 2 and 1, which is the base of the cowl.

To become thoroughly acquainted with this method, lay out the draft full size, meet every point as to widths in the two elevations, top and bottom views, and produce the exact curves, as good judgment is required to produce the curves after the points have been obtained. This method is the simplest that has been applied in body building and it should be practiced by every automobile body builder.

The cowl is then continued to section 7 and from there to front door joint 8, on which there is the full amount of turn-under, which is continued by the same amount of

(Continued on page 33)



SEVEN-PASSENGER SEDAN BODY, MOUNTED ON DANIELS CHASSIS.

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Commercial Delivery Body Fitted to Clydesdale Model 25

(See Working Draft on page 28 and illustrations on following pages)

The length of frame from rear of dash to center of rear wheels on the model 25 Clydesdale is 94 inches; from rear of dash to rear end of frame 135 inches, and the wheelbase 124 inches. The width of frame across front is 32⅛ inches and across rear part 36 inches. Distance from floor to top of frame when loaded is 32 inches.

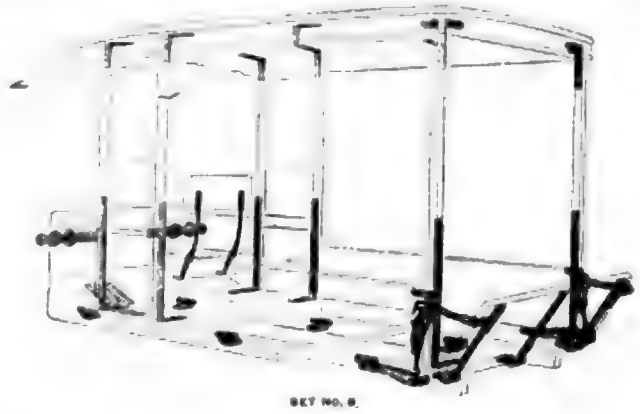
The length of body from out to out of corner posts is 108½ inches; length of front part from front surface of corner post to front of top is 29 inches.

The extreme height of body is 66 inches; the width on top part outside of moldings is 54 inches and on bottom part 46 inches; amount of turn under, 4 inches each side. The width of loading space inside at bottom is 43 inches, and 50½ inches on top part. The length of loading space is 93 inches.

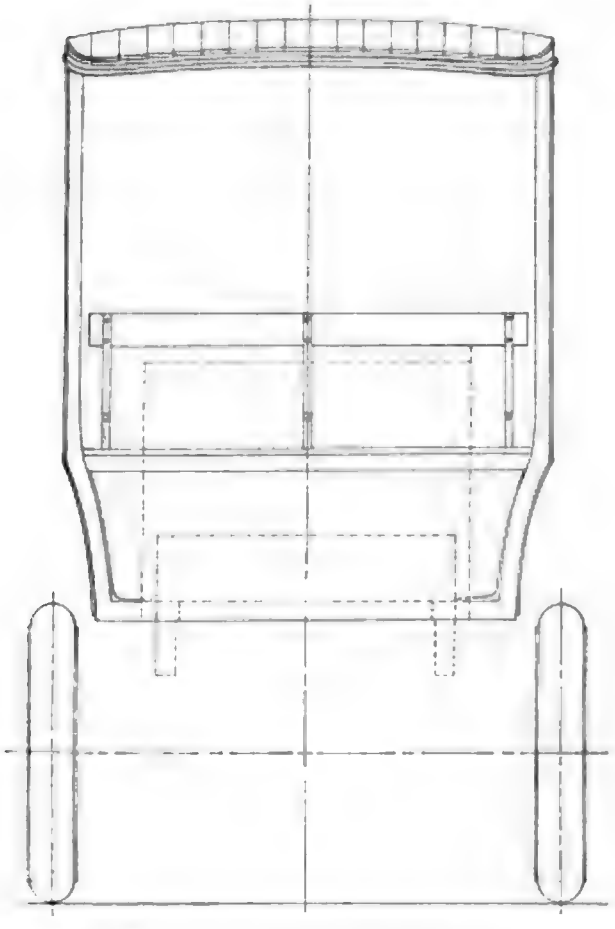
Construction of the Body

The two front posts on each side of the body are made 1⅜ or 1½ inches thick, because in most cases the glass frame is made to drop and the side panels lap over it part of its thickness, which must have sufficient gluing surface to hold the panel in its place.

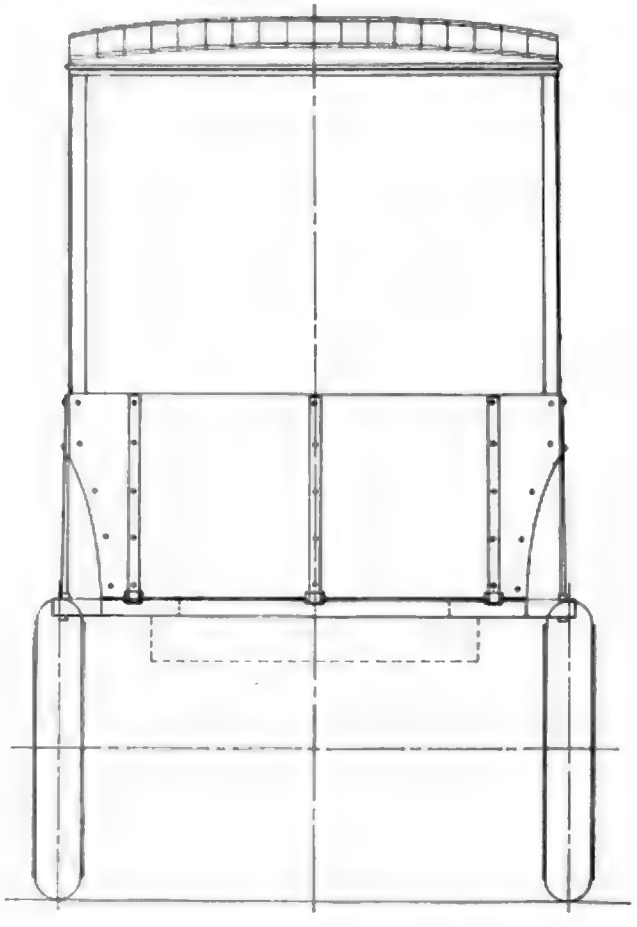
On some of the bodies the panels are lapped over the entire surface of the pillars; adding to this ⅜ inch to hold the glass frame in its place. This method gives ½ to



Body Irons Needed in the Construction of Commercial Body Described on pages 27-29 and 32



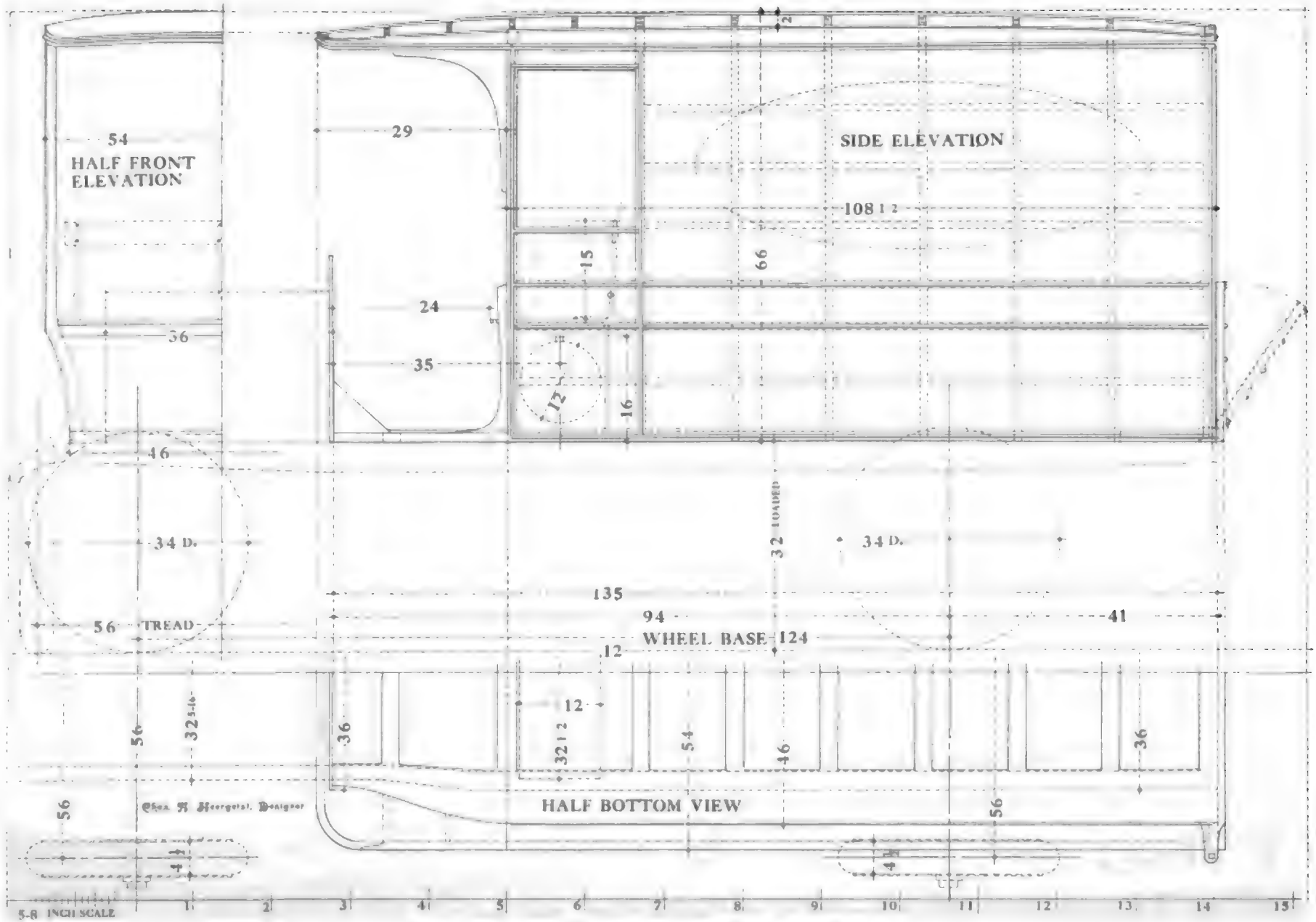
Front View of Commercial Delivery Body. See Working Draft and page 28.



Rear View of Commercial Delivery Body. See Working Draft on page 25

COMMERCIAL DELIVERY BODY FITTED TO CLYDESDALE MODEL 25

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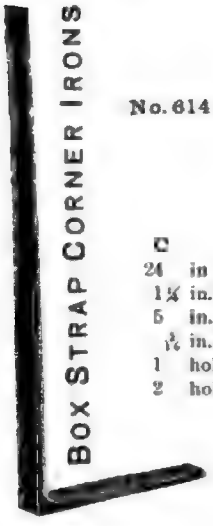


WORKING DRAFT OF COMMERCIAL DELIVERY MOTOR BODY.

See illustrations and descriptions of Commercial Body Irons, used in connection with this body, on pages 29 and 32.

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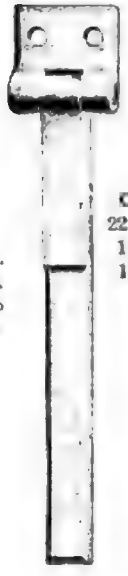
BOX STRAP CORNER IRONS



No. 6141

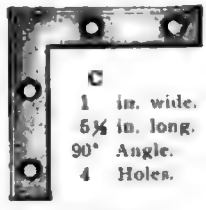
C
24 in long.
1¼ in. wide.
5 in. Foot proj.
⅞ in. Foot Bolt.
1 holes in strap
2 holes in Foot

END GATE HINGES



C
22 in. Panel.
1 in. wide.
1½ in. c. of Pin to c. of holes in Plate.

CORNER IRONS



No. 4380

C
1 in. wide.
5½ in. long.
90° Angle.
4 Holes.

Beveled Edge

No. 5810

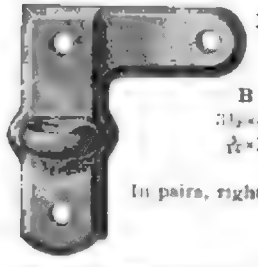


Top Rail Corner Irons

No. 6216

D
¼×1½ in. Rabbeted Corner.
8 in. length Post Strap.
1½ in. width Post Strap.
1¾×5½ in. length Rail Strap.
1¼ in. width Rail Strap.

For Top of Body Braces



No. 6182

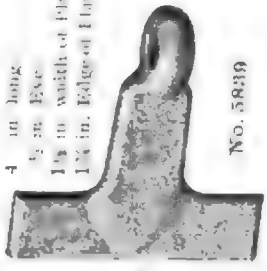
B
3½×4 in. Corner.
⅞×1 in. Recess.

In pairs, right and left.

No. 6182 A used with No. 6170.
No. 6182 B used with Nos. 6192 and 6193.

END GATE CHAIN EYES

No Offset in Plate



No. 5839

4 in. long.
⅝ in. Eye.
1⅛ in. width of Plate.
1¾ in. Edge of Plate to Shoulder.

K
13½ in. high from shoulder to flat part
8 in. length of flat part.
⅞ in. wide.
4 in. projection
½ in. Shank.
2½ in. length of Shank.

SILL BRACES

No. 6155



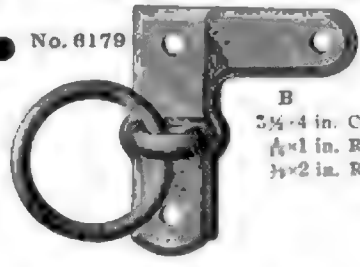
B
11½ in. length Sill Plate.
1½ in. width Sill Plate.
1¼ in. depth Rear Cross Bar.
3 in. width Rear Cross Bar.
4¼ in. proj. Rear Cross Bar.

In pairs, right and left.

For Rear Cross Bar

For Top of Body Braces

No. 6179



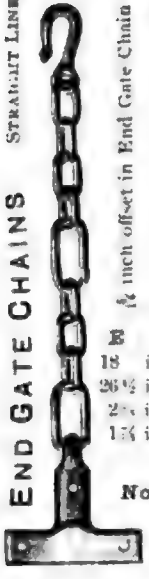
B
3½×4 in. Corner.
⅛×1 in. Recess.
⅜×2 in. Ring.

No. 6179 A used with No. 6170.
No. 6179 B used with Nos. 6192 and 6193.

In pairs, right and left.

END GATE CHAINS

Straight Links

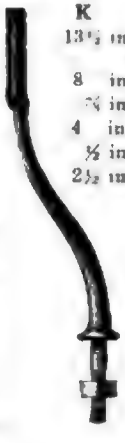


¼ inch offset in End Gate Chain Eye

E
18 in. Panel.
26½ in. long, inside of Hook to End
2⅝ in. Long Link inside. [Gate Eye.
1⅝ in. edge of Plate to shoulder of

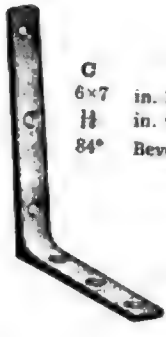
No. 6508

BODY BRACES



No. 6170

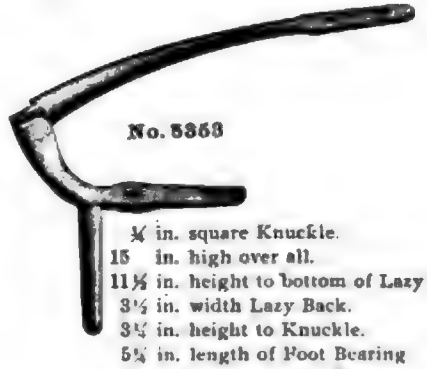
CORNER IRONS



No. 4424

C
6×7 in. long.
⅝ in. wide.
84° Bevel.

JOINTED LAZY BACK IRONS



No. 5363

¼ in. square Knuckle.
15 in. high over all.
11½ in. height to bottom of Lazy Back
3½ in. width Lazy Back.
3¾ in. height to Knuckle.
5¾ in. length of Foot Bearing
4 in. length vertical Foot.

Body Irons Needed in the Construction of Commercial Delivery Bodies shown on pages 27 and 28

(Continued on page 32)

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The Vehicle Monthly Course in Drafting and Construction

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Part E——Lesson 28. The French Method of Laying Out Square-Cornered Seats

(Continued from pages 34 and 35, September, 1919, of "The Vehicle Monthly.") (For description see page 31.)

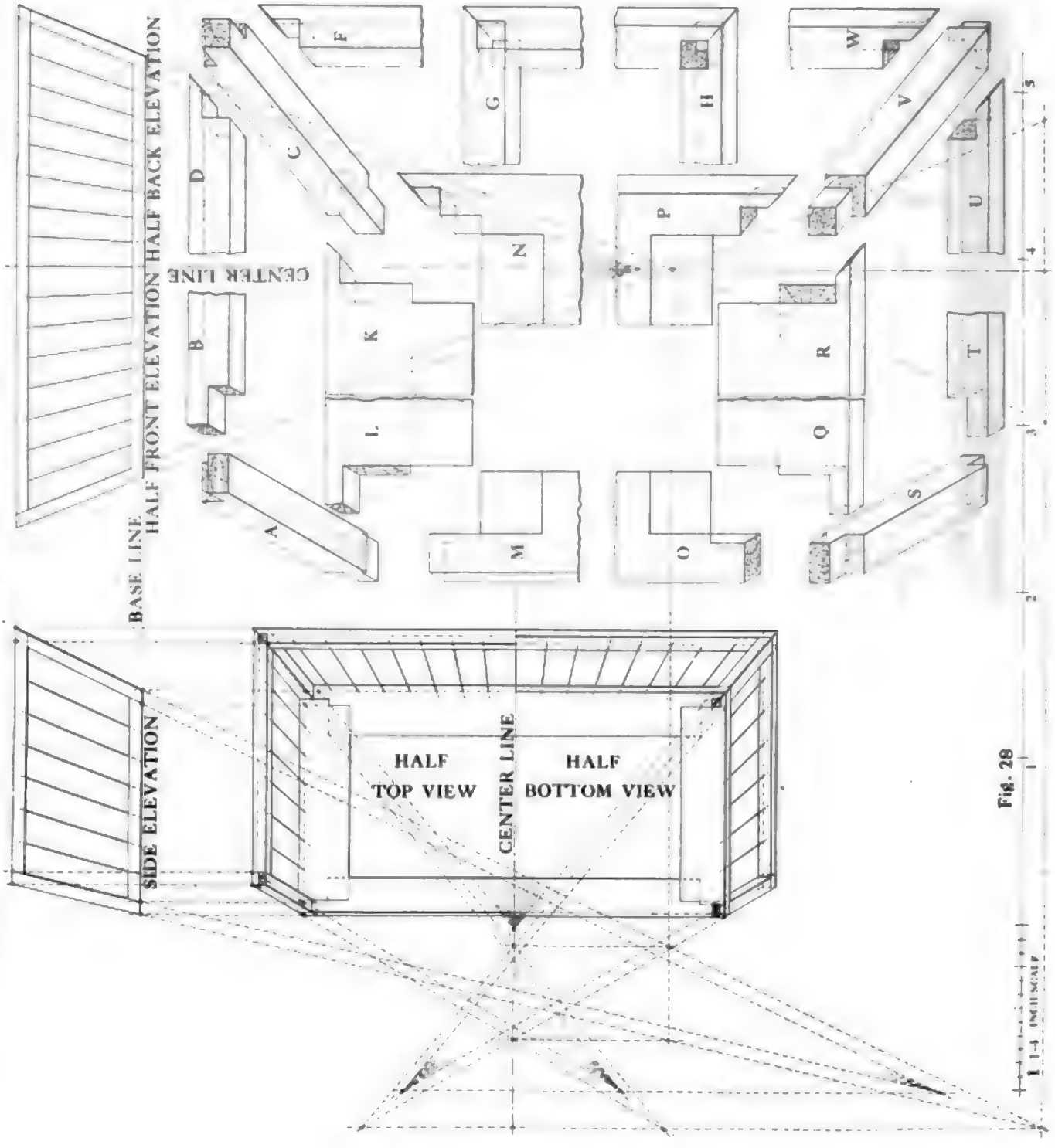


Fig. 28

The Vehicle Monthly Course in Drafting and Construction

By Charles A. Heergeist, Technical Editor and Draftsman of "The Vehicle Monthly."

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Subjects Treated in Previous Numbers

Part E—Lesson	1	Laying Out a Plain Board Seat	Part E—Lesson	15	Shape of Panel Taken Direct from Bottom View
" — "	2	Framing a Four-Cornered Seat	" — "	16	Laying Out a Square Cornered Spindle Seat
" — "	3	Framing a Round-Cornered Seat	" — "	17	Seats with Straight and Inclined Surfaces
" — "	4	Laying Out and Framing a Two-Passenger Seat	" — "	18	Round Cornered Seat Panel with Vertical Surfaces
" — "	5	Laying Out and Framing a Twin Seat	" — "	19	Obtaining Lengths, Heights and Curves by Triangulation
" — "	6	Constructing Round Cornered Seats with Strips and Boards	" — "	20	Obtaining Lengths, Heights and Curves by Triangulation
" — "	7	Constructing Round Cornered Seats with Horizontal Joints	" — "	21	The Creation of Bottom Curve, Length of Spindles and Position of Rails on Bottom View, by Intersections
" — "	8	The Laying Out of Proportional Corner Curves			
" — "	9	Establishing the Concave Surfaces of Seat	" — "	22	Diagram of a Round Cornered Seat
" — "	10	Length and Shapes of Concave-Convex Seat Strainers	" — "	23	Obtaining Lengths, Widths and Shapes of Seat Panels
" — "	11	Length of Spindles on a Round Cornered Seat	" — "	24	Obtaining Curves of Seat Panels Direct from Bottom View
" — "	12	Lengths of Seat, Spindles and Position of Rails	" — "	25	The Concentration of Diagrams
" — "	13	Panels on Inclined Square Cornered Seats	" — "	26	Obtaining Shape of Panel on High-Back Seat
" — "	14	One-Piece Metal Seat Panels	" — "	27	Straight and Convex-Concave Turn-Unders

BACK NUMBERS CAN BE HAD FROM THE PUBLISHERS.

Part E——Lesson 28

The French Method of Laying Out Square-Cornered Seats

(For Working Draft see page 30)

Explanation. Fig. 28. The French method differs decidedly from the American in the positions of the elevations, bottom and top view of the seat. The American body builder concentrates the working lines from which he takes his points as much as possible. For this reason the back elevation and bottom view should be placed in a horizontal direction, and the side elevations on either side of center line, thus making the draft longer and narrower across the draft board. The principle of laying out is the same, and the four corners of the seat on side elevation, back elevation and bottom view have their vanishing points.

This diagram has less side inclination than back inclination on rear end of seat. This is the general practice, making a better shaped seat, but does not affect the principle of laying out the seat. This diagram illustrates the easiest possible way to establish the lines of a square-cornered seat with horizontal seat rail. Note the framing of the seat on top and bottom view, which is shown on an enlarged scale to the right of diagram.

FRAMING SPINDLE SEATS

Spindle seats are built very light and therefore the framing must be well done.

The thicknesses for seat frames are as follows: ½ inch for sulkies; ⅝ inch for three-quarter buggies; 13/16 inch for full-size buggies and ⅞ inch for phaetons.

The width of seat pieces depends on whether the seats are square contracted or made with round corners; the sizes are from 2½ to 4½ inches.

The sizes for rails and posts are ⅝ inch, ¾ inch and ⅞ inch, and are either lapped or have tenons for seat posts and rails. The style of spindles are either turned, square, three-cornered, keystone shape, straight, curved outward or inward, convex shape or convex on top end and concave on lower end. The posts on all seats always conform to the shape of the spindles.

Whenever posts are inclined in one or two directions the dihedral angle must be found, and posts dressed to it; all rails must be dressed in the direction the spindles assume at the rail or seat frame.

Post A is straight dressed to the dihedral angle and then gauged both sides alike. The tenon is on lower edge and lap on top edge; for first-class work a tenon on the tail is preferred.

B is part of the rail for front post, showing the lap.

C is the rear post; it is beveled to the dihedral angle, gauged both sides alike, has tenon on lower end and laps on upper end.

D is part of the side rail, showing the lap and the miter.

E is the back rail which must be beveled after the back inclination, while the side rails must be beveled after the side inclination.

G shows both the rails in place without the post, looking at it from the top, while H is shown from bottom surface.

The rear corner of seat frame, top and bottom surface, is shown on K and L; M and N are the component parts. They are lapped and mitered, and when joined together a mortise is formed for the tenon. O and P represent opposite views from M and N.

Q, R, S, T, U, V, W represent the corners of the frame, the posts and the rails, viewed from bottom surface.

Problem. Fig. 28. Frame front and rear corners of seat full size; dress front post, cut tenon laps and shoulders to posts and rails.

Frame seat corners with laps and tenons, cut miters, cut the mortise so that the posts stand in exact position to inclination for both front and rear posts.

Make drawing for seat full size. Obtain dihedral angle and dress posts to it. Obtain correct height of posts and bevels for rails. Make sides with only part of seat frame and part of rail.

PART E—LESSON 29 WILL APPEAR IN THE NOVEMBER NUMBER OF "THE VEHICLE MONTHLY"

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(Continued from page 29)

STRAIGHT PATTERN



No. 9515 1¼ in. wide B
2¼ in. long.



DOOR LOCKS
"ACME"

1⅜× 3 in. Plate.
½×30 in. Rods.
⅝ to 1¼ in. thickness of Door.
½ in. square Handle Shank.
Anti-Rattler Springs on Rod Guides.

No. 5692

Body Irons Needed in the Construction of Bodies shown on pages 27-29 and 32.

½ inch more gluing surface and saves the routering of the posts where the glass frames move up and down.

The inside posts, of which there are ten, five on each side, for a full size commercial delivery body the posts are made 1 inch, 1⅛ inches and 1⅛ inches square. Consequently the ready-made inside post corner irons will fit all the posts, except the shape when the body has concave turn under, and this shape can be fitted cold, as the curve of the posts is very small. At the two front posts, one on each side, these corner irons are cut to the length to fit under the seat rail.

At the rear corner posts, the corner irons have a side foot projection and are furnished in pairs, right and left, 1 inch to 1¼ inches wide. The top curve corner irons are furnished with a 64, 71, 75, 81 and 84 degree bevel, ¾, ⅞ and ⅞ inch wide, fitting any top curve as at present made in almost all body shops.

The posts are fitted generally with tenons into the sills and lapped against the inside of top rails. All the side rails are lapped into the inside posts and mortised into the corner posts. The side surfaces of the body are covered with plywood, vehisote or poplar panels. The half front elevation shows the shape of the front posts.

Tables Referring to Commercial Delivery Body on Clydesdale Model 25

Number of Pieces, Sizes and Kinds of Timber for Commercial Delivery Body

Bottom Frame

No. of Pieces		Kinds of Timber	Thickness Inches	Width Inches	Length Ft. In.
2	Main body sills	Oak	1½	8	11-6
7	Bottom cross bars	"	1½	2¾	5
2	Front cross bars	"	2¼	2¼	5
1	Rear end cross bar	"	2¼	4	5
4	Bottom boards	"	¾	7½	9-2
1	Front bottom board	"	¾	16	2-9
1	Heel bottom board	"	¾	14	2-10
2	Heel risers	"	1½	14	

Posts and Rails

4	Front posts, two each side	Ash	1⅛	1⅛	5-6
10	Inside posts, five each side	"	1	1	5-6
2	Rear end corner posts	"	1½	2	5-6
12	Side rails, six each side	"	1	1¼	9-2
2	Side top rails	"	1⅛	4	11-4
1	Front cross top rail, curved	"	1⅛	2	4-6
1	Rear cross top rail, curved on top	"	1⅛	3	4-6
9	Top curves	"	1	1	4-6
1	Top curve above seat	"	1⅛	1	4-6
1	Seat board	"	⅞	18	4-4
1	Heel board	"	⅞	17	4-4
1	Board, back of gasoline tank	"	⅞	17	4-4
1	Drop gate board	"	1⅛	22	4-7
	Round finished moldings	"	⅛	¾	200

Side Panels

2	Upper window panels	Poplar or Artificial	⅛ or ⅜	4	1-10
2	Panels below fence rail	"	⅛ or ⅜	16	1-10
2	Main upper panels	"	⅛ or ⅜	38	9-5
2	Belt panels	"	⅛ or ⅜	7	9-5
2	Lower main panels	"	⅛ or ⅜	18	9-5
1	Top panel	"	⅛ or ⅜	55	11-6
2	Front curved panels	"	⅛ or ⅜	15	2-6
2	Extra front pillars, curved	Ash	2¼	7	2
1	Seat back	"	⅞	3	4-4

Making out a single order for body irons, needed in the construction of an eight post (each side) commercial delivery body as shown on page 27, corresponding with the Eberhard Manufacturing Company's catalogue numbers and illustrations of set No. 8 body irons.

16 Pieces — Inside post corner irons, No. 6141, C, 24 inches long, ⅜ inch wide; 5 inch foot projection; ⅜ inch bolts.

2 Pieces — Drop gate chain eyes; No. 5839; 4 inches long, ½ inch eye, 1½ inches wide bolted to end gate.

2 Pieces — End gate chains, No. 8508, 30½ inches long, straight links.

2 Pieces — Rear end body braces; No. 6170, L, 13½ inches high from shoulder to flat part; length of flat part 8 inches; ⅜ inch wide; 4 inch projection.

3 Pieces — End gate hinges, No. 5810, C, 22 inches long, 1 inch wide, 1½ inch bolt holes from center to center in plate.

2 Pieces — Top rail corner irons, No. 6216, D.

2 Pieces Right and Left — Rear end sill braces, No. 6155, B, for rear cross bar.

14 Pieces — Top rail and post corner irons, No. 4424, C, 6 x 7 inches long; ⅞ inch wide, 84° bevel.

2 Pieces — Front top corner irons, No. 4380, C, 1 inch wide, 5½ inches long.

2 Pieces Right and Left — Body rail braces, No. 6182, B, 3½ x 4 inch corner; ⅜ x 1 inch recess.

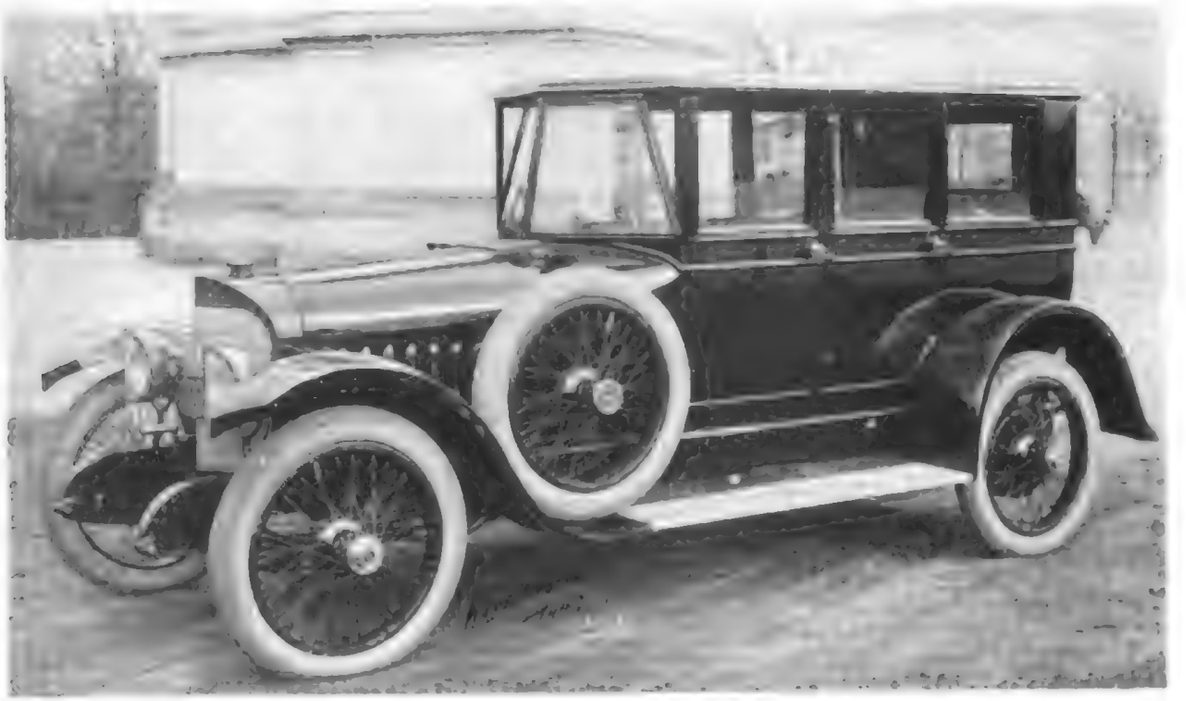
2 Pieces Right and Left — Body rail braces, No. 6179, B, 3½ x 4 inch corner; ⅜ x 1 inch recess, ⅛ x 2 inch diameter ring.

3 Pieces — Jointed lazy-back irons, No. 5353, ¾ inch square knuckle. (See illustrations and description on page 29.)

Body irons, if a commercial delivery body is built with rear doors, consist of.

6 Pieces — Straight door hinges, if body is built without turn under, 1¾ inches wide, 2¼ inches long, without holes.

1 Door Lock — One door lock device, No. 5692, 1¾ x 3 inch plate, ⅞ x 30 inch rods. (See illustrations and descriptions on this page, above.)



FOUR PASSENGER "CATHEDRAL SEDAN" BODY, BUILT BY SOWNEY BROS., PHILADELPHIA, AND FITTED TO A BIDDLE CHASSIS

Seven-Passenger Sedan Body

(Continued from page 26)

turn-under. The wheelhouse is parallel with center line, 47 inches across, square up and down as shown on working draft. Line K bottom view is obtained by deducting the amount of turn-under of side curve of body. The space between the rim flange and wheelhouse on this working draft is 1½ inches. If less is desired line S is drawn further out.

The window in the rear is 17 x 24 inches and is made to drop; the lines on side elevation, top and bottom views, show this.

There are two ventilators on top of body, directly above the front and rear seats, at the center of body. They are hinged and regulated by fixtures from the inside. The slanting front is composed of castings fastened to the standing pillar on top, in which the windshield rests. The side and rear end glasses are grooved into the standing pillars.

The five seats are placed in the best possible positions for convenience in entering the body and for comfortably seating the seven occupants. The space between the front seats is 6½ inches and between the auxiliary seats 8 inches.

Coatings That Prevent End Checking

Wood, whether in the form of logs, lumber, timber, shaped blanks, or veneer, will split and check at the ends during seasoning, if drying is allowed to go on at a natural rate through the end grain. To retard the rate of drying from the ends, it is necessary to cover them with some protective coating.

The law of end coatings, in simple terms, is that the harder and greener the wood, the more effective must be the coating. In its experiments to determine the practicality of various coatings and end dips, the Forest Products Laboratory found the following to be true:

Paint is convenient to handle, but is of low effectiveness.

White Lead is convenient to handle, and is of medium effectiveness.

Lorac, a commercial compound, is convenient to handle, and is of considerable effectiveness.

Rosin-lampblack is inconvenient to handle, but is of high effectiveness.

Rosin-lampblack is made according to the following formula:

Clear grade rosin—60 parts by weight
Lampblack—1 part by weight.

The rosin should be melted but not allowed to boil or froth. The lampblack should then be thoroughly stirred in. The ends of the sticks should be dipped in this molten mixture to a distance of about one-half inch. When hard, the coating should be smooth, free from bubbles, shiny, and an eighth of an inch thick over the end.

If the stock is to be subjected to rough handling which might cause the coating to chip when cool, linseed oil may be added, in the proportion of 1 to 15 by weight, but this will have a tendency to make the coating excessively soft in the kiln at temperature above 130 degrees Fahrenheit.

Difference Between Heartwood and Sapwood

In over 300,000 tests which have been made at the Forest Products Laboratory, Madison, Wis., on the various species of wood grown in the United States, no effect upon the mechanical properties of wood due to its change from sapwood into heartwood has ever been noticed. Any difference in the strength of heartwood and sapwood can usually be explained by the growth and density of the wood.

In other mechanical properties, there are differences between heartwood and sapwood which have an important bearing on their use for various purposes. The sapwood of most American species is considerably less resistant to decay than the heartwood, and where the wood used without preservative treatment in situations which favor decay, the sapwood is likely to have a much shorter life. In these particular cases, therefore, strength requirements may have an indirect bearing on the choice between heartwood and sapwood, inasmuch as wood infected with decay is likely to have its strength properties, particularly that of shock resistance, greatly reduced.

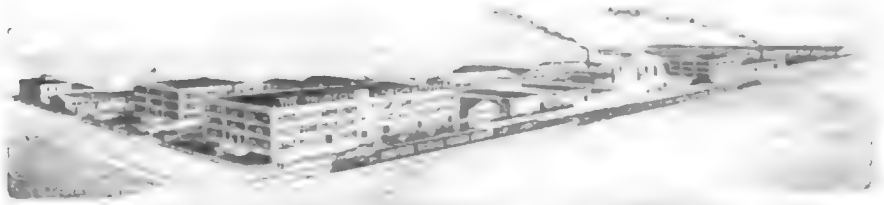
Expansion of Field Mfg. Co.

The Field Manufacturing Co., Owosso, Mich., makers of commercial truck bodies, are constructing additions to their present plant and expect to occupy them by November 15th. The entire plant will be equipped with new automatic machinery and no pains will be spared to make the Field plant one of the most complete of its kind. Plans are being made to manufacture at least 100,000 truck bodies during 1920.

In addition to manufacturing units for several large truck producers, the Field Manufacturing Co. will establish distributing centers in all the principal cities of the United States, where goods will be shipped in carloads and re-distributed from there in local shipments and drive-aways.

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Laboratory — THE TRUSCON LABORATORIES — Quality

The Truscon Laboratories

Manufacturers of
Automobile Colors, Undercoatings, Enamels, Color Varnishes, Baking Japans and Varnish

Detroit - Michigan

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Painting and Finishing

Quick Repainting of the Automobile

Often we have a car in the shop which must be put through a repainting process much quicker than is ordinarily the case. It may chance to be a one-coat color and one or two coats of varnish, according to the condition of the surface. After detaching necessary parts and getting the car up where it can be worked at most conveniently it is at once in order to clean the vehicle; this is no small job, at the best.

Very few cars can be cleaned for less than from $10 to $15, unless a good supply of steam is available for cleaning the chassis. The steam may be thrown upon these parts through a hose and it will be found a remarkable labor saving device. If steam cannot be had, equal parts of crude oil and turpentine, or perhaps better still one part oil to two parts turpentine, freely applied to the chassis and left to act upon the adamant accumulations over night, will be found a very strong detergent. Then with a knife and steel scraper it will be possible to start the grease and hard substances.

Use strips of burlap for wiping off the parts; cut these strips to a width of about five inches so they may be see-sawed over the surface. After getting off the bulk of the accumulations, again saturate the parts with a fresh application of turpentine and oil and leave stand for a few hours

Hard grease on the body surface may be saturated with raw linseed oil and this oil should be left on over night. Usually the spot of grease will be softened up to the extent of easy removal in that time. Then wash the car throughout, using a sponge dipped in flour of pumice stone for rubbing the surface as the work is taken along; use plenty of water in rinsing off and make sure to have the surface clean.

The light rubbing which the surface will receive with the sponge and pulverized pumice stone will help greatly to fit the surface for the color; it will lay down any possible gloss and in addition will serve to reduce dirt specks, etc.

The main thing in these quick jobs is to have the primary work and the smoothing and conditioning of the surface looked after amply before applying the color. It is never a paying move to have to resurface some parts of the car after getting the color on. Possibly a little extra work and time may be needed right at this point, but it is labor and time that will more than be made good when it comes to putting on the color, or at the longest, varnish. For this reason we choose to get the best possible surface conditions before applying the color.

After washing it is best to sandpaper the surface lightly with fine sandpaper in the event of some gloss remaining or some roughage showing here and there. A little lustre is a dangerous thing to paint over without first breaking the gloss and giving a foothold to the color or varnish-color

If the surface is found to be in good condition and without a perceptible gloss it should be looked over and any fractures or defects touched with color containing enough raw linseed oil to act as a binder.

The following morning fill these breaks with hard putty applied smooth and in a manner to require the minimum amount of reducing work. The next day sandpaper and touch the spots with some of the body color. In the late afternoon clean and dust the surface—speaking of the body of the car—and flow on a generous coat of the desired varnish-color, providing it is a black, or green or blue. Lakes, and some of the transparent colors, cannot be handled in quite this way.

This varnish-color, if employed in a ratio of, say, 4 ounces of color to a pint of varnish, will be fully strong enough to produce a perfect density of color.

Now, for a quick job without much refinement, simply dust and clean up in due time (which will be the morning after) and with a medium of quick-drying, fairly heavy, body-finishing varnish, flow the body surface The chassis, meanwhile, will need to be brought along with about the same process and finished with a hard-drying, chassis finishing varnish.

If the car shows fine checks, or perhaps even coarser ones, it will probably be in order to follow the coat of varnish-color with a coat of rubbing varnish into which has been stirred an ounce of color to preserve the shade intact. This extra coat will serve to fill or drown out the checks and will also develop the body of finish applied.

In the event of lighter shades of color or of transparent colors being employed it may be necessary, following the preparation work, to place a ground color over which to flow the varnish-color. This will take a little more time to work out and perhaps a little more labor may be needed, but it can all be taken care of speedily, provided the surface is in condition to at all warrant a light repainting job.

Admittedly, in the case of the yellow pigments, creams, ivory white, etc., this manner of fetching the finish along in the brief way referred to cannot be practiced to advantage; hence in the use of such colors a more extended period of operations will be necessary.

Groundworks

Vehicle painting would be poor indeed without the proper groundworks for the various colors which require such support. Many of our finest colors are so sensitive, and, for the most part, so transparent that without a good groundwork pigment it would be quite impossible to properly display them on the surface.

Prussian blue, a plodding sort of a color, will need a groundwork over which to be cast for respectable show. Ultramarine blue will likewise need a basic color to bring out its virtues in full array. Carmine, the wine colors, lakes, etc., all demand and must have the support which correct groundwork pigments yield richly.

It is plain to see, therefore, that these pigments are indispensable if we would do the best class of work. Ultramarine blue will take a groundwork color of lampblack, of ordinary brown, or one of the commoner blues may be treated with a slight addition of black, and made to pass very well for ground work purposes.

Lampblack will also serve effectively as a ground for Prussian blue. This blue, by the way, is interesting from the fact that while it is a powerful coloring material—indeed, more powerful than any we have knowledge of—it is most deficient in covering power, for which reason it will take a groundwork of the most opaque character. Lampblack shuts out the light of the undersurface completely and therefore does for the Prussian blue exactly what must be performed for it as a means of developing a strong and good job of color work. In the same way the groundwork helps the ultramarine blue to compact its rays and become a solid array of color with no streaks and weaker shadows of pigment

In the wine colors a groundwork of brown and black stirred together to catch the right share gives a basic pigment adequately dependable. Lakes are exceedingly transparent and sensitive in many respects and always need a groundwork or undercoat pigment. Lakes are rich in proportion to their depth and because of this due regard should be taken not to get the groundwork coat too light. An English or American scarlet lake, for example, will do well over a base of vermilion.

Wine color will serve as a groundwork for Munich lake; ivory black makes a fine ground for purple lake, either English or American. Wine color offers a good ground for carriage lake. Carmine will need perhaps a series of groundwork colors, this depending upon the shade of carmine needed. Wine color, medium shade, will give one ground color; Tuscan red another, vermilion still another, and so on to the various tones desired.

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An Essential Paint Shop Practice

We hear very much, indeed, concerning the sandpapering, rubbing and reduction of the various coats of paint and varnish applied to the vehicle; so much of this talk is current that one is almost persuaded to believe that the entire system of painting and varnishing consists principally of applying material and then through a protracted series of reductive processes removing it.

The thought occurs in this connection: Why not leave this material on the surface, or as much of it as possibly can be left on, and thus secure for the finish that measure of depth and substance so desirable in the best class of finish?

Even the primer, which it is declared should be a thin, oily coat, is, under the modern theory of surfacing, sandpapered and otherwise reduced to practically nothing above the surface. If this surface is taken care of properly prior to the application of the primer we can see no reason why it should be ground off, or nearly off, as a means of getting the correct smoothness; for of course nobody expects to get the surface level on a single coat of priming material.

And yet, sage advice is forthcoming from about every direction relative to the need of sandpapering the priming coat down sound and hard, whereas if the surface has been fitted as it deserves to be before putting the primer on, there will be small need of much sandpapering of this coat. It can be allowed to remain in bulk on the surface to reinforce the subsequent coats of material, and in such shape it is much better qualified to hold out permanently the coats coming after.

The same logic fits the application of the second coat of surfacing material; if the base or ground is right and the coat is applied in shapely form there is no real need of sandpapering and rubbing the coat unduly nor beyond breaking down the drift of dust particles and dirt working into it during application or through the drying period. All else is pure waste of labor and a detriment to the surface inasmuch as it weakens proportionately the coat, and indirectly at least all the coats.

Coming to the roughstuff coats why not let let these coats go to the surface thin enough to flat down perfectly and thus avoid the brush marks and the general roughness which marks the use of the heavier coats of this coarse material. By using a finer ground roughstuff, and using it thinner in consistency, it is possible to build up a foundation of roughstuff that is smooth in body, perfect in its flattening property, and capable with the proper number of coats of being rubbed to a level and smooth condition at the minimum amount of labor. In this manner it is perfectly feasible to develop a surface amply capable of holding out all the color and the varnish coats following it.

The main body of pigment is left in place since it has not been necessary to remove it through rubbing and erosive processes in order to get the correct quality and the desired amount of surface refinement. We have advocated in these columns for many years the use of a roughstuff thinner in body and capable of being brushed out smoother and free of brush marks and other evidences of a clumsy brush. In this form it will require a greater number of coats, but no greater quantity of material; and it will be possible to apply at least two coats of the stuff per day.

The good finish needs first of all an ample bulk of roughstuff ably refined and fitted well to do the work imposed upon it; upon this particular portion of the finish—for it must properly be included in the finish—a great strain is constantly imposed, and it is of the utmost importance that bulk and strength of material is present in splendid array.

As a widely known foreman vehicle painter once put it: "If you have got the roughstuff foundation right, all else will be right." At any rate, with the primary coats and the roughstuff all rightly fixed and mixed and in place, and by far the larger volume of these coats left permanently there, the plan of getting the color and the varnish coats applied well and good seems to be simple enough. Of course there must be no relaxation in this scheme of making everything smooth and clean-cut, and so it is important that the color coats be thinned and applied in a way to insure the finest results.

The principle we have urged with respect to the primary surfacing coats may with equal propriety be advocated for the varnish coats, including the varnish-color. Freely flowed-on coats, with absolute cleanliness, or as near to that as may be possible, lead the way to the minimum surfacing methods, and these in turn permit the maximum amount of material to be left on the surface to hold out and beautify the finish. It is all based upon the practice of lightly surfacing the coats to be surfaced and thereby leaving the largest possible bulk of material, consistent with the necessary surface quality, right in place to give to the limit of their strength to the support of the finish.

That may be called the latter-day painting cult, but it is the one plan above all others, as it appears to the writer, that seeks to provide ample support for the finish through the combined strength of all the coats.

Preparing the Automobile for Painting

The first big task that awaits the painter upon housing the car and assigning it a place in the shop, is cleaning the outfit. We recently met a man who became discouraged with cleaning his first car; ready to resign and all that. However, like any other disagreeable job it has its silver lining.

In the first place, the shop should have a perfectly strong and dependable set of wooden horses of a height to permit the workman to get under the car and labor at the maximum convenience. Let these horses be provided with strong plank approaches up which the car may be hauled, by a windlass if necessary.

Then after cutting off the bulk of the dirt and hard substances with a knife and otherwise working loose all shaky matter, freely saturate the parts with a medium composed of one part crude oil and two parts benzine, or if prohibited, turpentine; the latter is to be preferred in all cases. Allow this mixture to stand over night and if possible one day in addition.

Then with an old broom for some of the parts and with strips of burlap for still other parts, get after the chassis with determination and elbow grease. If this combination fails to clean these badly congested surfaces, apply a solution of sal soda or caustic soda, either of which is a powerful solvent. If hot steam is available at a strong pressure this will be found the quickest method of cleaning the parts. It is the practice in force in many city shops having the steam in usable form.

By taking advantage of all available means of removing the dirt and grease and accumulations this job of cleaning the car will prove after all far from the overpowering task pictured.

The body of the car also gives plenty of trouble at times with grease spots, tar nubbins, and compounds worked over the surface to give it an artificial lustre, etc. Raw linseed oil applied to tar and some like substances and allowed to stand for twenty-four hours will usually soften them up so that with turpentine and a coarse cloth their removal may be effected. There are also some special preparations on the market which are used for quickly removing tar.

Washing the surface with turpentine is also a good means of clearing the work of much roughage and foreign matter. Then after this work give the surface at least a light rubbing with water and pumice stone flour; this will clean up and make the surface receptive to the processes to come after.

The cleaning of the car, it will be admitted, is a job of magnitude and it should be charged for accordingly; at the present high wage scale an average price of $15 per car will be little enough. If the car owner will do it for less, let him go to it.

Varnish the Car Frequently

Naturally, it may be said, the painter is in favor of this; through diffidence or a disinclination to over-advertise his business, or for fear of embarrassing his client with a surplus of advice, he allows more often than not the matter to go by default. However, it is a live subject and should not be permitted to peacefully slumber as a notation among papers of varied importance in the office desk.

As a rule, the car owner is inclined to give his car the advantage of good care and protection; he is aware that this is economy and generally speaking if he can be shown that a fresh coat of varnish will protect the colors used on the car and give nourishment to the undercoats and contribute to the durability of the painting, all of which is an asset both present and ultimate, his business at least in seven cases out of ten may be secured.

Here is an opportunity through the medium of personal canvassing to acquire a new run of business, meanwhile helping the car owner to preserve the finish on his car at a cost considerably less than it will be if the varnish

is not renewed until some more convenient season, so termed.

Putting aside for the moment any personal interest which the painter may have in the matter, and approaching the subject from the standpoint of the car owner, let us observe the advantages of frequent varnishing. The well-painted and varnished car, it will at once be granted, is an asset of real value; it gives the owner a standing in his home town that is most satisfactory; it suggests, among other things, thrift, industry, prosperity and an appreciation of the beautiful.

Frequent varnishing contributes to the durability of the finish through forestalling the natural and inevitable decay of that finish. After a certain amount of wear there is a well-defined deterioration of the finish and if this goes on for a little space the color is practically certain to be affected. When this occurs the expense of recoating with color and bringing up the varnish coats rapidly runs into two and three figures; when the needy surface is caught in time the color retains its original shade and vitality and a coat of varnish, or at most, two coats suffice to protect all.

If the recently painted car could be touched-up-and-varnished, say after six months' service, the finish would be strengthened immensely and the need of repainting postponed to a remote day. The car in for a coat of varnish in due season helps the business of the painter, to be sure, but it also furnishes the car owner a fine return on his investment.

The All-Purpose and Other Varnishes

If a Diamond Dick type of a chap wearing a black mask and carelessly fingering the trigger of an automatic pistol were to back you up against a brick wall and demand whatever long green might be reposing in your hip pocket, you would immediately desire to haul him before a just judge for sentence. Your sense of justice would impel you to this move.

What, then, shall we undertake to do with the gentleman with the nimble vocabulary who so graciously endeavors to sell us the all-purpose varnish at a price suggestive of a cut-rate drug store?

Calmly considered, the all-purpose varnish is a delusion and a snare; or, rather, if we may be permitted to say it, there is no such thing as a real all-purpose varnish worth our regard.

Possibly in some lines of work—although for the life of us we cannot guess any particular line—the all-purpose varnish may be usable and able to perform a function of value, but to say that such a varnish is qualified to fill a long-felt want in the vehicle paint shop would in our opinion prove a rash statement.

In vehicle work there must of necessity be rubbing varnishes designed for medium, quick and slow drying; finishing varnishes, hard drying, medium and highly elastic are likewise required. Chassis varnish of various sorts are in like manner indispensable.

So it is easy to note that the all-purpose varnish hasn't a show to make a name for itself in the finishing of automobiles and carriages, and in our opinion it is a mighty confiding paint shop owner who buys the all-purpose varnish.

However, we do not remember a time in the recent history of the trade, comparatively speaking, when specially designed varnishes for specially designed branches of work and special purposes, have been in so great a demand. There must be a rubbing varnish for this and for that special need; likewise, of finishing varnishes there is no end of individual requirements needing an individual varnish fashioned precisely to meet the special purpose of the buyer. The varnish makers have responded most successfully to this demand, and it is about the easiest thing imaginable for the buyer to have his special needs supplied in short order.

On the hardware counter of the ten-cent stores one may find a wrench which in response to a little shifting of handles becomes an all-purpose tool, but for pity's sake, don't expect your varnish to shuffle itself into any forms after the manner of the ten-cent wrench. It can't be built that way.

After-the-War Favorites

Now that the thunder of the guns no longer thrills the world and people become more calm and better prepared to see with a clear vision, car owners and users, and perhaps we should say the public generally, have taken with something like feverish enthusiasm the old favorites of the color kingdom and crowned them with approval.

As a result we find on the boulevards and highways and on the remoter roads of the country not a few colors which made a name for themselves back in the yesteryears when horse-drawn vehicles were in fashion.

Many of the fine, attractive blues are to be greeted on every hand; rich and radiant and set off with a grand flow of varnish, these old-time pigments vie successfully with the newer types of the blue family.

In greens you may see olive, Merrimac, Brewster, Quaker and sage green, every one a fit member of a royal family. These colors are all solid, good-covering pigments; they are durable, brilliant of tone and take splendidly to striping. Carmine of the deeper tones, maroon of the medium shade, and some few of the old-time carriage reds bloom graciously on touring cars of the medium weight.

Perhaps the main thing that serves to gain the approval of the public and the painters is that these favorites of a former day have good body and substance; they can be wrought upon the surface without any fussing or much preliminary work beyond making for them reasonable methods of preparation.

You just have to bring the surface along in the best possible manner, making it level and smooth and with as few flaws as is possible. Being solid colors, as a rule, they may be applied directly to the surface; most of them with one coat will invite application of varnish-color, thus making it comparatively easy to get them fixed correctly on the surface. And in the light of experience we may not fear to compare them with many of the newer pigments in point of durability, fine looks, and ease of upkeep, this latter being an important consideration when ultimate cost is to be reckoned.

Practically all of these colors are greatly improved by striping, although not much of this work need be applied. A few lines to set forth the charms of the color by contrast will suffice. Under severe stress of service they have been accounted worthy of a good remembrance, and this accounts for their coming back to reward the old-time carriage man with a chance to study and admire their good looks. New colors may come and go, and prove their merit, but this revival of the old pigments is well deserved and a pleasure.

Profitable Painting Business

From what we are able to gather from considerable correspondence coming from various parts of the country it is our impression that less unprofitable business is being done by vehicle paint shop owners than formerly. As a matter of fact, we believe that shop owners are better informed as to the cost of doing business than ever before; they have learned in the course of the fleeting years that it is after all not all painting to paint.

Running a vehicle paint shop is a business proposition to be handled as any business man would handle it. Help cannot be paid, trade established, credit founded, home interests and surroundings maintained, and the respect and esteem of the community merited except through a strict business management of the shop.

The bookkeeper in the paint shop is no less important than the painter. Indeed, we sometimes think he is the most important, for it is by facts and figures that the pulsebeats of the business are registered.

Not long since, the writer chanced in one of the numerous thriving central New York cities and upon the principal street stumbled upon a vehicle paint shop with a fine sign over the door, an attractive entrance, showy windows, and an air of thrift and prosperity permeating the entire establishment. In the city papers of the day, catchy reading notices supplemented an original display advertisement, and in connection with this entire plant there was an unmistakable suggestion of up-to-date, keen-for-competition business quality. This is exactly as the business should be—business all over.

There has been no little talk among paint shop owners as to the percentage of profit that should be reckoned, and it has been voiced in some quarters—and properly voiced, shall we not say—to the effect that not less than a 40 per cent. profit should be realized on all business transacted.

Brushes should have close, daily attention on the part of the paint room stock keeper. Every brush deserves to be looked after and kept fit for instant use. Surely, good brushes are expensive enough at this time to demand the most circumspect care-taking.

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Moisture Absorption Through Varnish

In experiments made by the Forest Products Laboratory, it was found that varnishes do not entirely prevent the transmission of moisture into wood but merely retard it, and that apparently there is no difference in moisture absorption through the coating due to the species of wood used.

The panels used in the experiments were of yellow birch, basswood, red gum, African mahogany, white ash, white pine, Sitka spruce, southern yellow pine, bald cypress, incense cedar, white oak, western yellow pine, Port Orford cedar, and sugar pine.

Three coats of high-grade spar varnish were applied to four panels of each species. Two panels of each species were brush-coated and two were dipped by a special dipping machine designed to secure an even coating. The panels were allowed to dry seventy-two hours between coats and ten days after the final coat before they were given the moisture-resistance test.

The moisture-resistance test consisted in exposing the panels for seventeen days to a humidity of 95-100 per cent., or in an atmosphere practically saturated with moisture.

At the end of this test, it was found that all the brush-coated panels had absorbed between 5 and 6.5 grams of moisture per square foot of surface, and the dipped panels between 4 and 5 grams. Such variations in amount of absorption as appeared could easily have been due to inequalities in the application of the varnish. It was quite noticeable that the dipping process produced a more moisture-resistant coating than brushing.

Real Economies

There are many false ones, it must be allowed, but the real ones are what the vehicle painter is today looking for. One of the real economies is the use of brushes which past all manner of doubt are money savers, even though the purchase price may have seemed rather high as compared to other makes "costing-less-but-just-as-good."

The brush which is a perpetual shedder of hairs and bristles is an old offender; it nevertheless penetrates the inner sanctuary of the paint shop despite its nefarious reputation. It sometimes comes under the glamour of a great name, and again it comes a stranger and goes an outcast. To describe the various offenses of the inferior brush is to trespass upon space unduly; it merely need be said that only the good brush, regardless of the purchase price, is the real economical tool.

To obtain such a brush is not difficult; the advertising pages of THE VEHICLE MONTHLY tell the story of the economical brush equipment. No reader need go astray in buying the brush equipment; neither can any reader afford to disregard the teachings to be found in these same advertising pages, and deliberately buy on the basis of price only and quite regardless of quality. Quality, after all, is the supreme consideration. Disregarding this, the paint shop owner goes abroad hunting for trouble and is certain to find it.

Another real economy is the employment of competent help. Inasmuch as labor in the paint shop represents 75 per cent. of the actual cost of conducting the business, speaking approximately, it is of the first moment that this help is of a good quality. Roustabouts, clock-watchers, chronically tired, represent dead timber under the weight of which any painting business is sure to get round-shouldered in a hurry. If it survives this class must be dispensed with in the quickest possible time.

The selection of an efficient working force is not a matter of a few days; there will be choosing and weeding, and sending to the discard for weeks—even months—before a well-balanced, "all together now" pay roll of mechanics, working for the best interests of "the boss," can be mustered and brought into a paying co-operation with the enterprise. Only such a combination can ever be expected to strike the high tide of prosperity for the business, and it is only through the attainment of such a working combination that the paint shop manager may hope for the success upon which real economy is founded. Good tools, efficient workmen, superior supplies, thrift, enterprise, politeness—all these are means to a fine paint shop prestige.

The Basis of Durability

Some twenty-five years ago a widely known chemist broadcasted the doctrine that oil is the life of the paint, and although he was sharply attacked for the statement much publicity came to him as a result of the promulgated theory.

The fact of the matter is that it cannot be clearly proved that raw linseed oil is the life of the pigment; nor can it be shown beyond a doubt that the pigment, as a part of the mixture which we variously mention as paint, color, etc., is the life of the material complete and ready for application.

It is more reasonable to suppose that both the paint and the paint vehicle—that is, the raw linseed oil, turpentine, japan, varnish, etc.—are perhaps about equal in their contribution to the durability of the finished material.

Raw linseed oil is an acknowledged drying oil and all drying oils are by nature destructible simply through the ravages of time; they dry up and wear out and become as the grass that groweth up. To describe such an oil as the life of the paint is, it seems to us, a move to ignore the weightier matters back of the wearing of the paint.

All pigments are said by chemists to be endowed with life and sinew and substance; add to these pigments enough raw linseed oil to bind them tight to the surface and it is not an unsafe prediction to make that they will wear strongly and give a good account of themselves; and this despite the fact that they are not strongly endowed with the oil medium. Indeed, any reader of this department may, if he chooses, test this matter out to his satisfaction by simple panel coatings exposed to the weather.

One of the most popular sayings of the day is "in union there is strength," and it would seem to particularly apply to the case in point, for may we not believe with plenty of evidence to support the belief, that a union of both oil and paint, or varnish and paint, makes a material better qualified to wear and look like a prince among pigments than if this same material were deprived of the contributary resources of one of the mediums mentioned?

Personally, we have for years believed—with this belief based upon many demonstrations and comparative tests—that the merits of a pigment do not rest alone upon any one factor or medium comprising it.

Rather have we proved in cases fairly without number that only through a combination of both oil and pigment, or varnish and pigment, are we able to produce the ideal material for vehicle work; the material having a just balance of life-giving elements and bristling with tenacity and vigor.

The Varnish Room

Someone has recently complained that the average varnish room is today in no respect the equal in light and ventilation and in other necessary things of the old-time varnish room. Perhaps this is true, taking the field as a whole.

It must be allowed that many varnish rooms located in the big city garages where the painting, varnishing, etc., is performed upon the second floor, are sadly lacking in the correct balance of light and in the necessary amount of fresh air. These are two factors which the varnish cannot well do without and safely take care of the flowing and drying.

Varnish simply must have light and ventilation, or in other words, fresh air. The air gives it a drying quality which it cannot have otherwise and which it cannot do without. Oxygen is life to the varnish as it is to the varnisher; ventilation hastens the drying, gives it increased lustre and makes it more reliable. Light also facilitates the drying, it increases the brilliancy of the varnish. It also enables the workman to perform better work. The varnish room should be a clean affair, or at most, as clean as it is possible to have it. The vacuum cleaner daily used will assist much to keep the room clean—walls, floor, ceiling, etc. The room should be barren of furniture save a couple of boxes and one or two movable "helps."

In the city garage varnish room these simple mediums are not frequent enough to be had; very often the ventilation comes from a central dome high overhead, an exceedingly imperfect plan for fetching fresh air into the room in a quantity sufficient to meet the needs of the work and the workmen. Often, too, the light is permitted to reach the room through windows set high enough up from the floor level to deny the inmates the comfort of looking through them. In such cases the diminished amount of light must be accepted with as good grace as possible; in the matter of ventilation we urge taking enough air through the windows to furnish in connection with that brought in through the ventilator in the ceiling the necessary amount.

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Upholstery, Toppings and Mountings

The Art of Motor Car Trimming

It has been truly said that the automobile or carriage trimmer must "quilt like an upholsterer, stitch like a harness maker, and sew like a tailor." It is just as necessary that he should have good taste and a knowledge of design, proportion and color. The materials he uses are among the most costly of those employed in the factory and require great care in storage and in working, to avoid waste. So there is a great deal for the young automobile trimmer to learn before he can consider himself an expert.

Mr. Newcomb's series of articles, now running in "The Vehicle Monthly," are intended to cover the whole subject of automobile upholstering. He has taken up the art at the beginning, and as the series proceeds will impart to his readers many useful hints and helps, as valuable to most journeymen as to the average apprentice. The series will conclude with the selection of several typical cars, for which Mr. Newcomb will furnish complete trim instruction from the start to finish.

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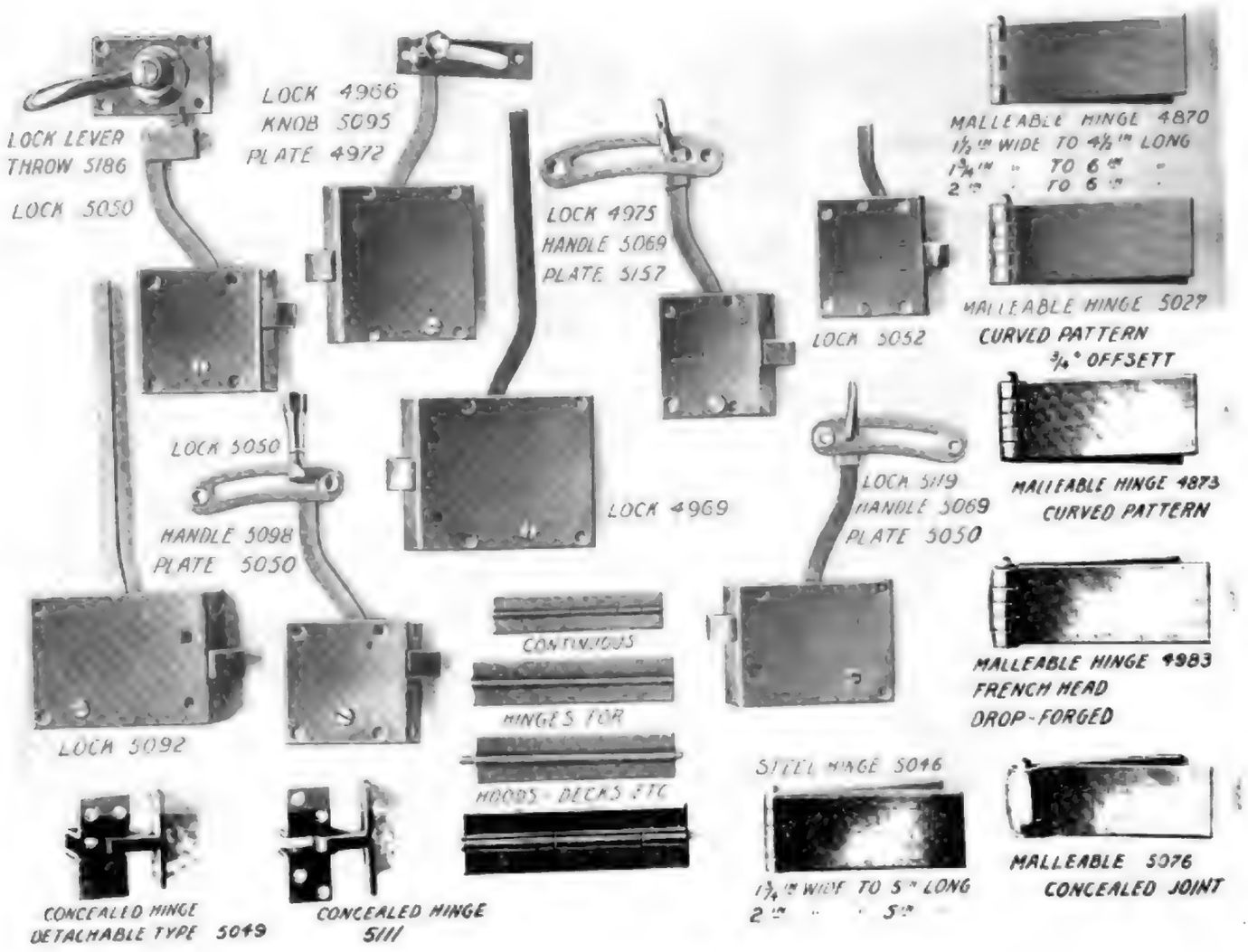
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Upholstery, Toppings, Mountings

Setting a "One-Man" Top

By C. G. COOK

Draw first the square as shown in heavy lines on diagram. It is not absolutely necessary to draw the body, but as the length of the body and the position of the windshield must be known before drawing the top, it is better to have the outline of the body. The above remarks also hold good as to the height of the top, called the "head room" or "head space."

After the exact length has been decided on, with a curve pattern mark the shape of the upper curve of the top. The height of top from bottom boards to under the bow is 52 inches, and on rear seat the height is 38 inches to under the bow, and on front seat the height from top of cushion to under the slanting bow is 37 inches. Make side quarters 10½ inches deep, give 4 or 4½ inches drop on rear end, and on front end to top of bow. If more or less drop is desired, give more or less drop to side quarters

The above dimensions vary with the position of seats and the depth of the cushion, as some seats are close to the bottom boards.

Having the draft completed for length, height, shape of upper curve depth of side quarter and position of goose neck, open up a set of "one man" bow sockets, and lay it upon the draft on top of goose neck. It does not matter what style or make of socket, as there are different kinds in the market, but be sure that the eye of the socket comes directly over the bolt, over the goose neck center.

Accurate calculations are necessary to locate the various joints to fold the top, and if these centers are not in the right position the top will not fold flat, as shown on rear end of body.

The main joint is at A, and takes the position on B, when folded. This joint A must correspond with the length of rod C, with centers on D and E. When folded, joint D drops to F and the space between centers D and E and F F, must be exactly alike; otherwise the top will not fold flat. In fact joints A, D E, F F, and center joint G, must move in unison, otherwise the top will not fold flat

The above holds good with bow H. Joint K, when folded, drops down to center L, and if this center drops too low it will drop too far inside the back and bow H must be moved with center K, toward center joint G, on main bow, and must also be lengthened at M.

Joints N and O must be in the right position to have the exact length to correspond with centers on L and P when folded, as both must have the same length. All these centers can be moved to suit the height and length of the top, and special care must be taken that the joints move so that they do not come in contact with each other, which would prevent the top from folding flat. These calculations to obtain the exact centers must be made with patterns, using nails or brad awls for centers.

After the bows have been fitted to the sockets and covered with bow lining, tack the storm valance to front bow, then we are ready to set up the top. For this purpose most trimmers use a specially made frame, with the goose neck and windshield attached to it, but we prefer the body, when it can be

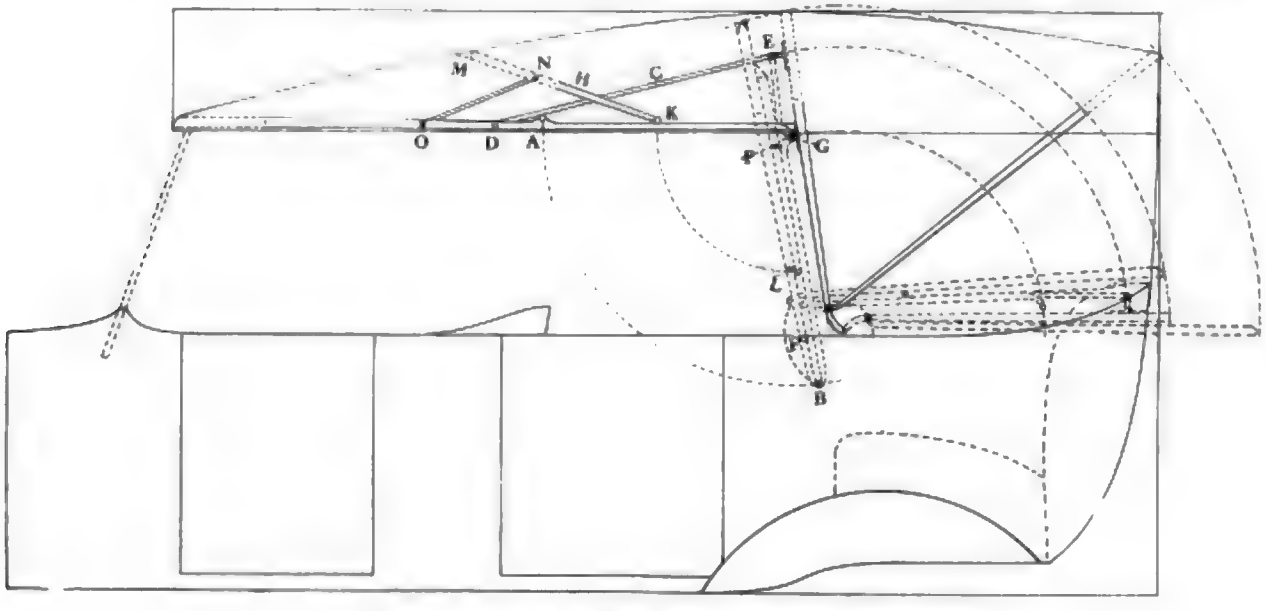
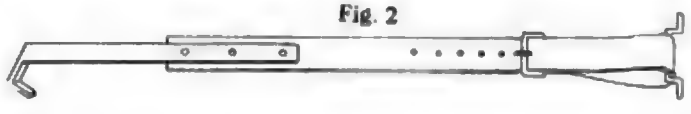


Diagram Illustrating the Proper Setting of a "One-Man" Top.

Fig. 1



Fig. 2



(Continued on page 48)

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A New Era in Motor Car Upholstery

By JOSEPH A. NEWCOMB

With production of automobiles again reaching the point where it was previous to the war, it is interesting to note whether any advance has been made so far as trimming is concerned.

With a lapse of over a year since any real interest was taken in passenger automobiles, due to the fact that the question was raised as to their being "essential," and due also to the fact that the manufacturing plants and the labor were required for other purposes, it seems that we are due for a new era in automobile trimming.

Times Change and We Change With Them

When man's attentions are diverted from his usual vocation, and then after a period such as has just passed, particularly one with so many trials and tribulations, heartaches and sacrifices, his attention and endeavors are reverted to their former channels, it seems that a change of heart, a different vision, broadened or narrowed views, must result.

This change in character, for that is really what it amounts to, must manifest itself in one's work. It perhaps will not be so bold a change as to become particularly noticeable to the average layman, but to one who has followed a certain calling for years, the gradual change will be quite noticeable.

Our histories prove that this is to be expected. Taking architecture or furniture as an example, we know that changes in conditions created periods of designs different from those preceding them—sometimes not radically different, but different enough to make the productions stand out pre-eminently as creations of the times through which their creators were passing.

Clothing likewise has felt the changes through which each decade passes. An old family album or a collection of photographs of leading men of the same country, covering a period of a hundred years, serves as a striking example. A study of this kind portrays to us the life of the days when they lived and of conditions in general.

There is no reason why automobile bodies, or the trimming thereof, should escape the effects of such an evolution. With this thought in mind we recently made a trip to various sales rooms both in Philadelphia and New York for the purpose of noting whether the change is as yet noticeable, and whether its tendency is radical or conservative. The writer does not propose to state at this writing what our personal opinion is regarding the style or the changes, but we shall describe some of the bodies seen and call attention to features which were particularly striking, even though, in our own modest way, we do not consider them good or as advancing the art of trimming.

One very prominent feature is the tendency of all manufacturers to concentrate their efforts on heavy work, particularly on the sedan. The tendency seems to be toward the establishing of the sedan as the standard product.

The character of the designs, the methods of accomplishing the results, are perhaps the same in this post-war period as they were preceding the war, but with this one big difference: There is no particular effort toward lavishness in design, but rather a hard, persistent effort toward perfection. The general character of all the work shows this. The work is plain but neat, showing a concentration of effort on securing just these results. The absence of "gingerbread" is particularly noticeable, and the quality of the work shows real mechanical training.

Closed Body Refinement

There is a refined quietness noticeable in the upholstering of all closed work. This applies, however, only to the character of the work, since there is a very strong tendency toward the blending of colors in the selection of the cloths used for upholstering. In fact, we have never before seen so many color and shade combinations used in the upholstering of vehicles.

In connection with the simplicity of design it is noticed that more attention is being paid by the body designer to what can really be accomplished in upholstering. Hard and difficult features, which were previously left to the trimmer to accomplish as best he could, are being eliminated, either by making proper provision for the trimming, or by properly finishing certain parts so that they may be painted or hardwood finished.

In the cheaper lines of touring cars one-man tops are wholly trimmed with some sort of rubberized material, grained to imitate leather. Even in the better grades of cars is this true, using a better grade of material and almost invariably using a head lining.

The absence of Victoria tops is particularly noticeable. We do not recall seeing a single touring car on a sales floor either in New York or Philadelphia, showing a Victoria top. However, we believe this is due rather to the fact that the factories are trying to eliminate any and all types of bodies requiring special attention in construction and building. We say this also because of the almost total absence of so-called collapsible jobs, except those which are custom built. It appears that the manufacturer is confining his efforts to five types of cars, regardless of the price, and leaving the special types entirely to be handled by the agencies direct through custom body builders.

The Most Favored Types of Bodies

A two passenger roadster of smart design; a roomy five and seven passenger, a comfortable, real, honest-to-goodness touring car; a three-passenger coupe; a five-passenger sedan of conservative lines; a big limousine, seem to be the goal toward which the large manufacturer is aiming.

Big Opportunity of the Custom Builder

Thus the field is opened up to the custom body builder for special roadsters with concealed deck seats, extreme and characteristic lined touring cars, superb landaulets and town cars, broughams and cabriolets. Since the tendency of the manufacturer is toward refinement and better work, concentrating on a few designs, the buying public is being educated as to what can be accomplished and should be expected, and as that education advances and a desire is created for something superfine, attention is directed toward the special designs of the custom body builder. The well-equipped, wide-awake creator of designs and builder of custom bodies has a much larger field and brighter prospects for ample business and prosperity than ever before.

A few of our large custom builders realize this and some of the cars which they have recently completed prove that they are well aware of what is expected of them. Their jobs are as fine as have ever been exhibited. Lines are true and graceful, pleasing to the eye and full of individuality. The painting is being accomplished in a manner worthy of the reputation that real coach finishing established, and the upholstering is really and truly wonderful.

War Made for Efficiency

The one outstanding feature which we believe the war has developed to a fine degree is that of efficiency. Not alone is it noticeable in the automobile line, but in everything we buy. The shortage of labor, together with war requirements, and the fact that certain essentials and a few luxuries must be manufactured under forced draft, so to speak has compelled all of us to lend our best efforts toward accomplishing results in the best manner possible. And this is being evidenced in all our work. There seems to be the feeling that everything is going to be gauged, weighed and measured, or that someone is going to check us up with a micrometer. The exactness with which work is being accomplished is due entirely to our training during the war period and our efforts having secured for us a successful accomplishment, they are readily adopted as the proper ones and used now in our regular line of work.

Better Attention to Springs and Foundations

One of the features noticeable in the upholstering of all types of bodies is the particular attention being paid to springs. At last the basic principle of spring construction for real comfort is being recognized. The springs are fast being made to form a real foundation for the upholstering. The shape, pitch and softness are developed in the spring itself and not in the topping or covering. Together with this is the much larger use of interlaced

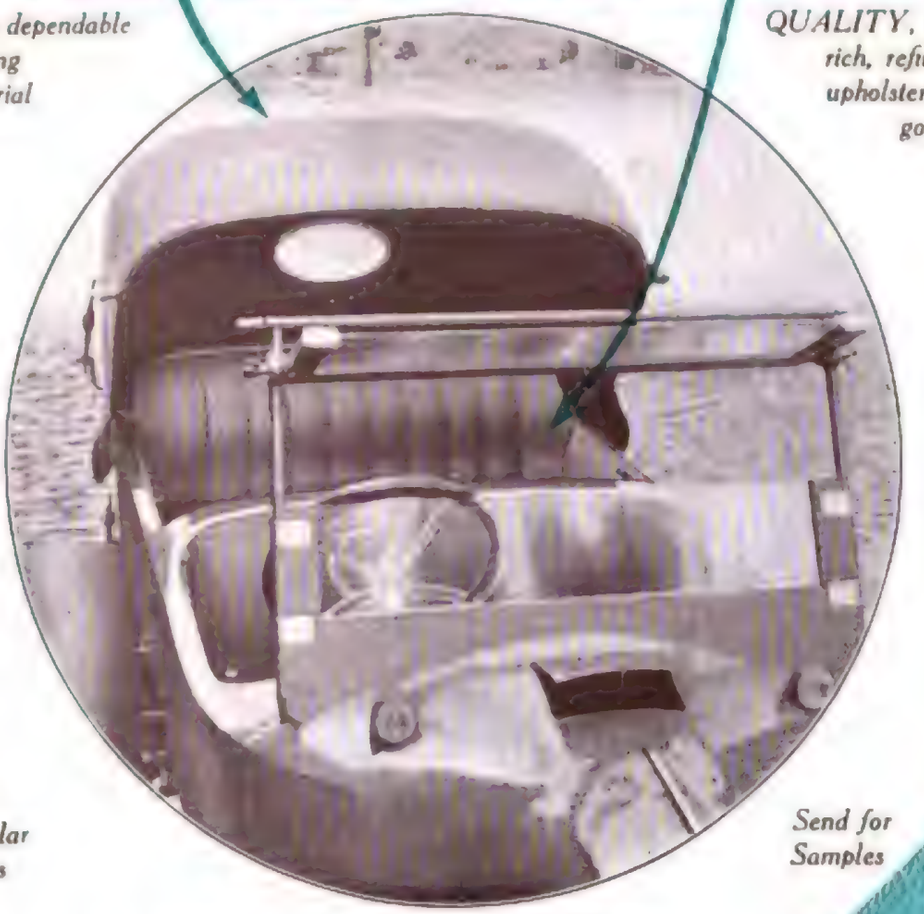
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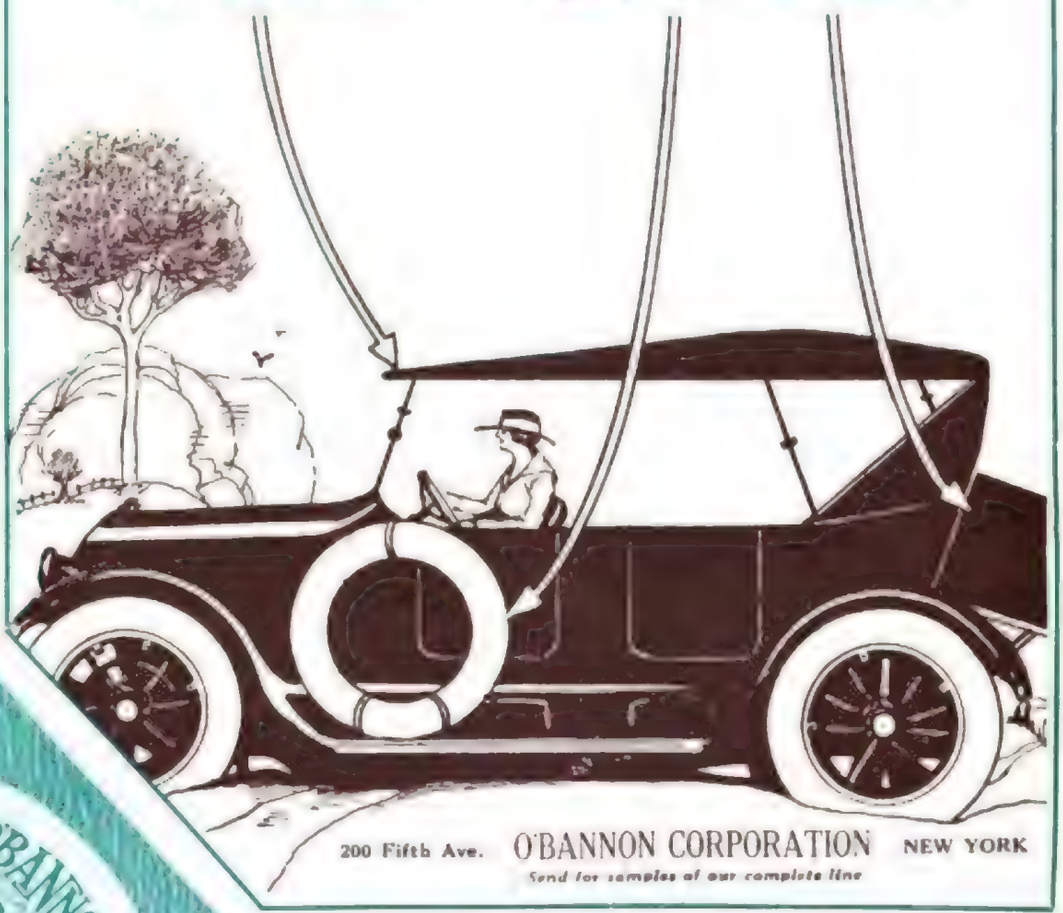
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hair, cut to fit the spring and forming a real covering, yet not detracting from the resiliency of the spring. This, together with the cotton, used either in layers or in batts, makes a sufficient pad so that the spring is not felt, yet permitting free action of the spring, according to the requirements. This method is also a valuable labor saving one, and prevents to a great degree the over use or wasting of materials.

Using interlaced hair and cotton filling for the pipes or plaits, it is much easier to secure a firm, even and well-shaped upholstering than with the old method of piling hair. A less skilled mechanic can secure a better piece of work with the new method and do it in less time.

Strong Demand for Mohair

There is also a very strong demand for the use of mohair for upholstering. It is being furnished in a great variety of colors and stripes. It is being extensively used in color combinations and is making a very attractive body that pleases the motoring public.

The absence of laces is particularly noticeable in closed body work. Wherever a lace can be eliminated without detracting from the beauty of the design, it is done. We have seen several bodies on which a lace was used only around the finish of the back and around the edge of the head lining. This appeals to users very strongly for the reason that welts and laces are always the first part of the upholstering to show wear, and there is nothing which detracts so much from a well upholstered job as uneven, crooked and loose laces. Many doors are being trimmed by making up the pad on the bench, turning under the edge and running a single or double line of stitching around the edge.

Interior Fittings and Mountings

Paneling of various portions of the body is being resorted to, particularly when using a color scheme combination, and to very good effect. Regarding interior fittings and hardware, there seems to be a very strong effort being made to use "period" designs. "Adam" style, so easily recognized by the urn and scrolls, seems to be the most popular. In fact the general appearance of the entire interior of closed bodies seems to reflect a tone of refinement so pronounced that when one enters the door he is made to feel at once that no effort has been spared to make the body the most satisfactory and comfortable means of transportation yet placed on roads.

Bodies Now the Selling Argument

There is nothing which has tended to increase sales more than the beauty of design and luxuriousness of the bodies and the upholstering. This is evidenced in the advertising of the manufacturers. The stress which is laid on the beauty of the car, its seating arrangement, appurtenances, soft, springy backs and cushions, prove that the manufacturers realize the tremendous value of a well-upholstered body in making sales, and are insisting on getting the best that money can buy. It therefore behooves every automobile upholsterer and trimmer to lend his best efforts toward the realization of perfection in vehicle upholstering.

The Trend in Cushions and Backs

In the upholstering of automobile bodies there seems to be quite a diversified opinion as to the proper kind of a spring to use for cushions and backs. It is observed that some manufacturers adhere absolutely to the double type of spring. By this we mean, the type of spring construction which uses a heavy, sturdy spring construction for the base or foundation and provides numerous small light spirals on top, giving the effect of a very soft cushion or back.

Others are using a sturdy spring construction throughout, the coils held together and bound with wire or a steel band. Still others are using what is known as a lace web type, which is a particularly well made spring construction bound and held together with a series of spiral steel lacings. This type of spring stands up very well and truly forms a comfortable spring foundation.

While speaking of springs we cannot refrain from again calling attention to the necessity of making proper provision for the springs. By this I mean making ample allowance so that the spring will not be "bound;" also constructing the spring according to the purpose it is to serve. Width, depth, height and pitch all have a bearing on the number of spirals to be used and the proper gauge of wire required to secure maximum resiliency.

In some bodies there has been a lack of planning and forethought regarding the height and depth of cushions. Some bodies do not permit the proper height or depth of cushion and without this the most capable trimmer cannot get a comfortable, well-proportioned seat.

Certain body builders still insist on building the pitch of a cushion into the frame of the body. By this we mean they pitch the seat frame so as to allow the same height spring in the back as in the front. While, theoretically, this looks like the proper method it does not prove so in practical body building. The reason why that plan is not good is easy to explain. When the pitch is in the seat frame the spirals in the spring construction set at right angles to it; they lean backward instead of standing vertical and plumb. The action of the spring is therefore retarded and the shape of the front of the cushion is distorted. We are firm believers in making the seat frame level and putting the pitch in the spring construction, keeping the face of the cushion square up. In this way you get the full benefit of the spring action.

Lights, Plate Glass, Metal Frame

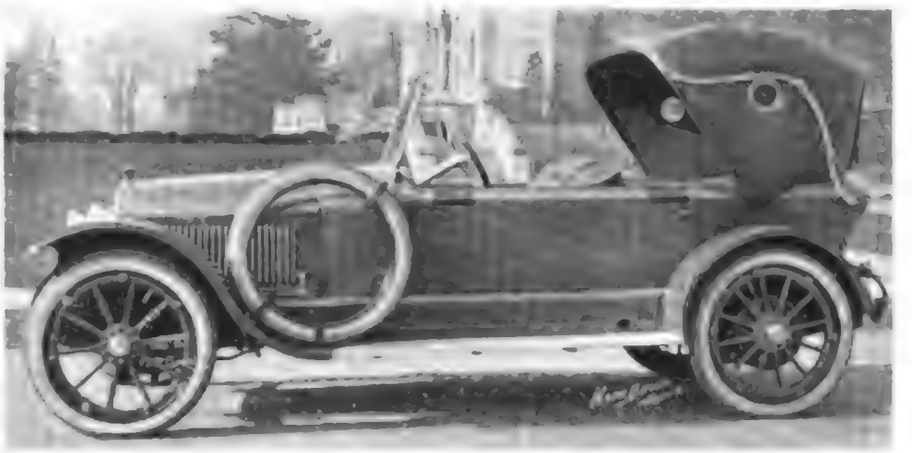
In touring cars and roadsters there is noted, for fixed or permanent curtain lights, the almost total elimination of celluloid for vision or observation lights. The celluloid is replaced with plate glass, bound usually by a metal frame. These are made and used in a variety of shapes and sizes, some manufacturers of cars having adopted a peculiarly shaped light which has become a sort of trade mark of the car. This type of light certainly adds to the beauty and appearance of the cars, besides being much more serviceable.

A Special Four-Passenger Victoria

The entire equipment on this car was built at the factory of The A. H. Gabel Co., Inc., Rochester, N. Y.—body, hood, fenders, windshield, top, and in fact everything that appears in the photograph with the exception of the chassis and tires.

The doors of the body are flush with the other panels of the car and there is a compartment at the rear of the body directly back of the top with a place for tools and for the curtains, etc.

This body is upholstered in waterproof cloth, blue and gray mixture, and the lining



SPECIAL FOUR PASSENGER VICTORIA BODY.
Designed and built by the A. H. Gabel Co., Inc., Rochester, N. Y.

There is an opening at the rear of the front seats, providing sufficient leg room for the passengers occupying the rear seats. On the top of the front seats there is a compartment in which gloves, goggles, etc., can be carried.

of the top is the same as the upholstering. The top is equipped with an extra flap which buttons on the rear bow of the top and also to the fasteners on the bar running across the top of the windshield at the front. The side curtains are of Jiffy style on one cable,

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which attaches to the windshield and to the top at the forward joint prop of the top.

The floors, both front and rear, are covered with carpet which harmonizes with the upholstering used. The lamps, hub caps, windshield, top joints and all mountings on the car are nickel-plated. The cowl of the body is equipped with a ventilating fixture which is controlled at the instrument board.

The entire car is painted Denmark blue, dull finish, striped one-half inch of Dresden blue around break of body and edged on each side with artillery gray. The hood is striped the same, and the fenders are striped the same as the body. The wheels are painted Dresden blue with striping to harmonize.

The instrument board is covered with cloth and all instruments mounted on this board are nickel.

The doors are trimmed with bellows pockets and when not in use they are flush with the upholstering of the doors, which is in plain style.

The binding of the upholstering is all hand buffed straight grain black leather. This gives the body a decided "line" around its upholstering and around the top of it.

The rear of the body, or tonneau, is lighted by specially designed lights concealed in the upholstering in the opening of the rear of the front seats, which when lighted, not only illuminate the interior, but also the steps of the car when the door is open. The lighting arrangement in the front of the car is under neath the cowl.



DEMOUNTABLE TOP COUPE.

Built by The A. H. Gabel Co., Rochester, N. Y., as a special job for Mr. C. F. Buehr of Strong Motors, Inc., Rochester, distributors of the Chandler car for western New York. This body has full length doors, plate glass throughout, cloth upholstery and special dome lights. Upper body is painted light gray, lower part in coach lines, fenders enameled black, and wheels painted gray.

Seating Plan of Daniels Sedan

There are two individual seats in front, with a six-inch space between the seats and center. Between the two front seats and rear seat are two auxiliary folding seats, with open lazy backs. Space between auxiliary seats of seven inches.

The rear seat is built for three passengers and is 20 x 45 inches. The rear seat is 6 inches above the frame and top of cushion 9 inches above the seat boards.

The front seats are 6 inches above top of frame, and top of cushion 14 inches from the top of frame. The two folding seats are 12 inches above top of frame, 15 inches from top of cushion. Seats slant 1 inch toward rear.

The design is well laid out and the car is upholstered with cloth without the use of lace. The interior top part is finished either in mahogany filled in and varnished, or with the regular head lining.

Bowser Oil Storage and Service

S. F. Bowser & Co., Inc., Fort Wayne, Ind., manufacture tanks of many kinds, but this company's system for handling lubricating oils will appeal to every garage-man who sees it in operation. The tanks are furnished in units of varying capacity, which can be placed side by side like the units of a sectional filing cabinet as seen in business offices, the entire battery, with as many units as needed, having a neat and unified appearance. Provision is made for easy transfer of oils from the barrels to the tanks. There is a gauge with each unit which tells the number of gallons contained in the tank, while the perfected Bowser pump delivers precisely the quantity of oil the customer orders. Oils are kept in their original state of purity and there is no drip nor waste. While the tank units vary in capacity they are standard in height and depth, with width only being varied. Ask the company for circular describing this convenient and money-saving system of storing and dispensing oils.

Setting a One-Man Top

(Continued from page 41)

obtained, so that the curtains can be fitted at the same time.

With the spreader sticks, see Fig. 1, and the back straps, Fig. 2, the top can be held in place while being trimmed, after the pads and webbings are tacked to the top.

Spreader sticks can be taken off when the top is finished and the regular back straps can be tacked on instead of the strap with hook as shown in Fig. 2.

The makers of one-man bow sockets furnish blanks for trimmers to fill out so that they can have the sockets made to fit any make of car. All the trimmer has to do is to give the bow setter the length of the bows, which is done by making the draft as shown.

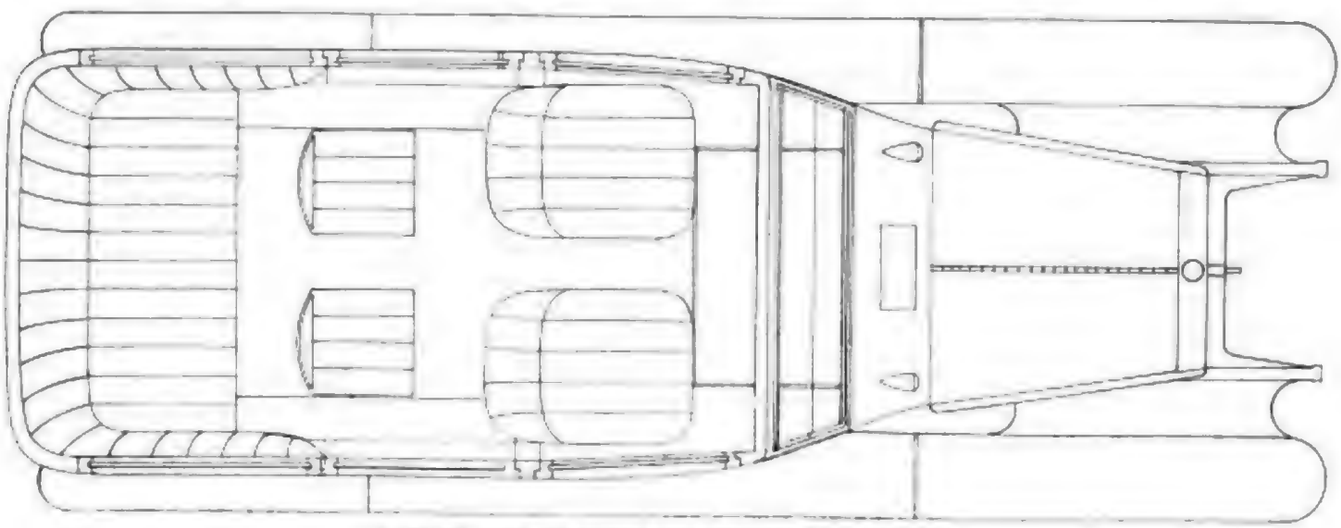


DIAGRAM VIEW OF MOTOR CAR SEATING ARRANGEMENT.
From a design furnished by Daniels Motor Car Co., Reading, Pa.

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News in the Trade

The C. B. N. A. Convention

The forty-seventh annual convention of the Carriage Builders' National Association was held at the Hotel LaSalle, Chicago, September 23, 24 and 25.

The members of the association and the vehicle trade in general found a hearty welcome in Chicago, where the association held a profitable convention two years ago.

The second city in the United States presents many places of interest, aside from the convention. No more pleasant place could be found for a vacation trip in September, and as a consequence between three and four hundred persons journeyed to the convention.

The full program, as printed, was carried out. On Tuesday, President A. H. Ahlbrand, Seymour, Ind., delivered his opening address, and the various committees were appointed.

On Wednesday, the second day, the different standing committees made their reports covering the year's activities, and Homer McDaniel, Cleveland, Ohio, spoke on "The Accessory Trades." On this day, also, the new president was elected, the choice falling on Frank Delker, Henderson, Ky.

Henry C. McLear, who has served the association as secretary almost since its organization, was elected an honorary life member, with the same salary he has been receiving as secretary. George Huston, Cincinnati, Ohio, was elected secretary-treasurer, with no salary attached at present.

Addresses by Well-Known Trade Authorities

C. E. Adams, of the Cleveland Hardware Co., Cleveland, Ohio, made an address on the subject of steel, which was very enlightening, as Mr. Adams is an authority on that metal and its products. George B. Shephard, of Eberhardt Mfg. Co., Cleveland, Ohio, addressed the meeting on the subject of "Hardware." Carl D. Fisher, president of The Standard Wheel Co., Terre Haute, Ind., talked instructively on "Wheels."

Resolutions were drafted and sent to Secretary Henry C. McLear, at Mount Vernon, N. Y., expressing regret that his illness, from which he is slowly recovering, prevented his attendance at the convention.

From Cincinnati and St. Louis

Resolutions endorsing the "open shop" were sent to Judge Gary, and also to the "Commercial Defense League." Another resolution was sent to Washington advocating the quick return of the railroad properties to their owners. The place of the next meeting was left in the hands of the Executive Committee.

Most of the familiar faces were to be seen at the convention, and there were large delegations from such vehicle centers as Cincinnati and St. Louis. A good representation of Chicago builders attended the convention sessions.

As usual, numbers of the members were accompanied by their wives and daughters, who lent their charm, not only to the social events on the week's program but to some



A. H. AHLBRAND, SEYMOUR, IND.
President Carriage Builders' National Association

of the business sessions as well. They were handsomely entertained by the local committee.

On Tuesday evening a reception and dance was held on the nineteenth floor of the LaSalle, and on Thursday evening the annual banquet was staged in the Louis XVI room of the same hotel. These two events constituted the principal social events of the convention.

Annual Meeting of C. H. A. T.

The twenty-ninth annual meeting of the Carriage, Harness and Accessory Traveling Men's Association was held at the same time and place as the C. B. N. A. convention, the business meeting occurring on Tuesday evening, September 23rd.

The annual C. H. A. T. banquet was held on Wednesday evening, the 24th, at which several eloquent speakers from all branches of the vehicle industry entertained a large gathering of the traveling men and their friends.

Buggy Production and Material Prices

Altogether this was one of the most enjoyable conventions held by the C. B. N. A. and the C. H. A. T. in recent years. Everyone we talked with says the buggy business is exceptionally good in all parts of the country, and that making more buggies is simply a question of securing enough material and the necessary labor to produce the goods. All the manufacturers are filled up with orders, but prices of material are soaring in every direction, with only the blue sky in sight.

The Exhibitors

The following is the list of exhibitors who had taken space prior to the opening of the convention. Additional space was contracted for by several other firms, but as the names could not be secured before our going to press, the additional names will be included in our November number:

Edw. F. Alt Company, Cincinnati, Ohio.
Auto Vehicle Parts Co., Cincinnati, Ohio.
Backstay Machine & Leather Co., Union City, Ind.
C. C. Bradley & Son, Syracuse, N. Y.
Brewer-Titchener Corporation, Cortland, N. Y.
F. S. Carr Co., Boston, Mass.
L. C. Chase & Co., Boston, Mass.
Cleveland Hardware Co., Cleveland, Ohio.
Columbus Bolt Works, Columbus, Ohio.
Conneaut Leather Co., Conneaut, Ohio.
Eberhard Mfg. Co., Cleveland, Ohio.
Fernald Mfg. Co., North East, Pa.
Firestone Tire & Rubber Co., Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Illinois Iron & Bolt Co., Carpentersville, Ill.
Kelly-Springfield Tire Co., New York City.
Keystone Forging Co., Northumberland, Pa.
Monarch Carriage Goods Co., Cincinnati.
Moosman, Yarnelle & Co., Ft. Wayne, Ind.
Mutual Wheel Co.
Ohio.
Owensboro Forging Co., Owensboro, Ky.
Pioneer Pole & Shaft Co., Piqua, Ohio.
Queen City Forging Co., Cincinnati, Ohio.
Raser Tanning Co., Ashtabula, Ohio.
Sheldon Spring & Axle Co., Wilkes-Barre, Pa.
Standard Parts Co., Cleveland, Ohio.
Union Bow Co., Cleveland, Ohio.
Ware Bros. Company, Philadelphia, Pa.
West Tire Setter Co., Rochester, N. Y.
C. A. Willey Co., Hunter's Point, L. I., N. Y.
Wood, Smith & Co., Chicago Heights, Ill.

The Late W. W. Harral

The many friends of Major W. W. Harral, for so many years identified with the Fairfield Rubber Co., Fairfield, Conn., will be grieved to learn of his death on September 16th last. Major Harral had the misfortune of breaking his hip several years ago, and since then has suffered considerably. Members of the Carriage Builders' National Association will recall that until the Fairfield business was disposed of to another concern, the Major was a regular attendant at all conventions, where he had a pleasant greeting and a handshake for everybody.

The "Overland Four," Just Out

The Willys-Overland Company on October 1st introduced to the motoring public the new "Overland 4," featuring the three-point spring construction brought out by Overland engineers.

Three Point Spring Construction

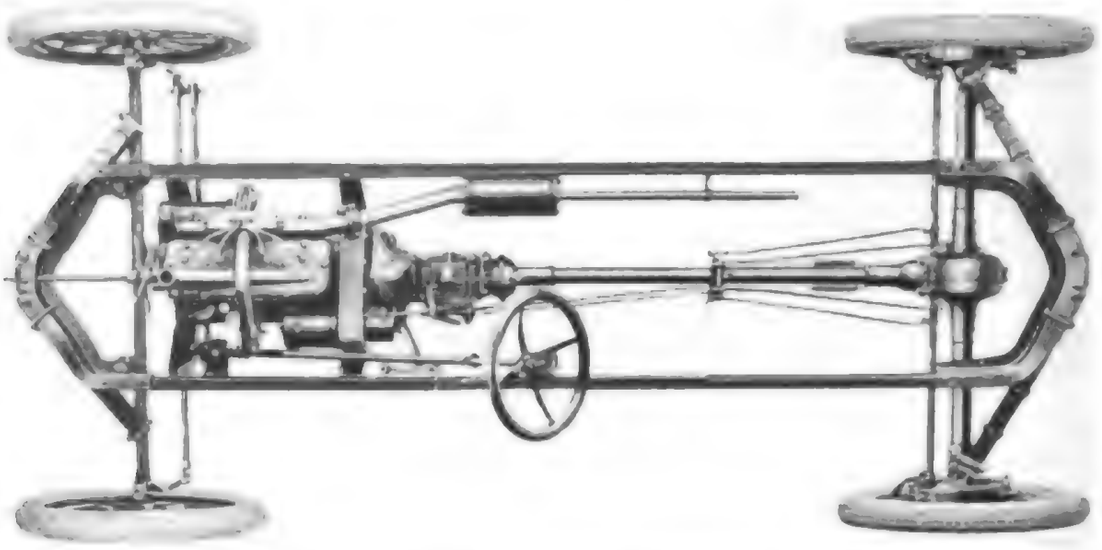
The springs on the Overland 4 extend fifteen inches from a point on the chassis beyond the axles at front and rear, giving a wide diagonal shape to the springs. The car has thus an actual spring-base of 130 inches, although the car wheelbase itself is 100 inches. Each spring flexibly responds to its task of keeping the body and passengers riding on a constantly even keel. Bobbing, sideway, and lurching are materially lessened. The result is a roomy, easy-riding car on a new type of springs, so designed as to absorb road shocks from the worst of pavements or roads. The Willys-Overland engineers make the unusual claim of having produced a car that rides well on any road.

Other Interesting Features

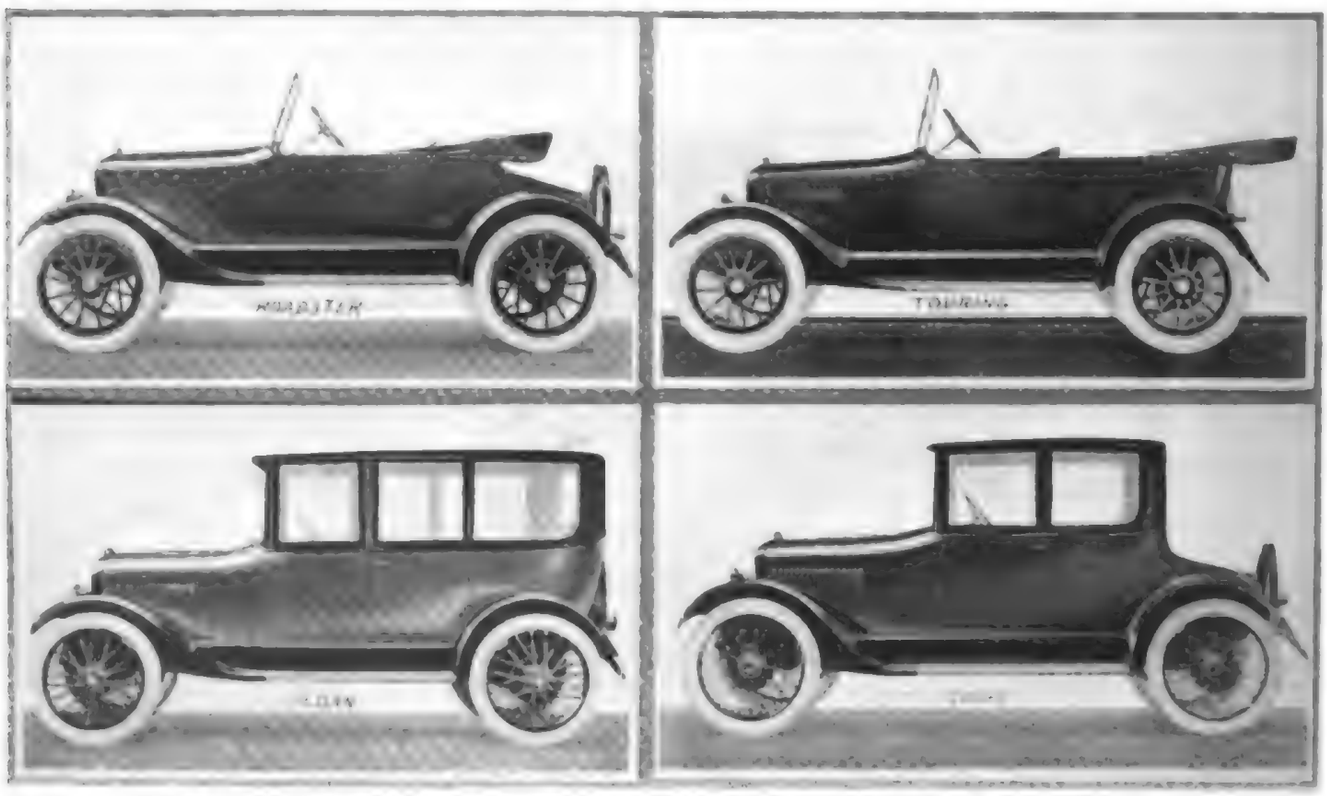
The motor of the Overland 4 is cast en bloc with a removable head. It has generous valve opening.

The lubricating and oiling system require no pumps The oil is circulated by pressure automatically created and the water is circulated by the thermo syphon system or natural cooling method.

The steering apparatus is of the planetary gear type with the gears at the bottom of the steering column. By this arrangement all



CHASSIS OF THE NEW OVERLAND "4". NOTE THE THREE-POINT SPRING SUSPENSION.



FOUR NEW BODY MODELS ON THE NEW OVERLAND "4," NOW BEING DISPLAYED BY OVERLAND DEALERS.

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the strain is taken at three points instead of at one.

The clutch is of the single plate type now used by 71 per cent. of the motor manufacturers. The selective gear transmission has three speeds forward and reverse. It operates in oil.

The front axle is of chrome nickel steel which affords both light weight and strength. The front wheels have tapered roller bearings. The rear axle, also of chrome nickel steel, is three-quarters floating. The differential and rear wheels operate on annular ball bearings.

The car is equipped with two brakes—foot and hand. These work on 10-inch drums on each wheel and to assure safety are larger than necessity demands.

Upon the instrument board, or "keyboard," as it is called on the Overland 4, is centralized the hand throttle, spark and choke control, and the ignition and electric buttons, together with the speedometer dial and current indicator.

In addition to the hand throttle there is a foot accelerator handily placed. The clutch and brake pedals are adjustable to reach.

The wide-deep seats of the Overland 4 supplement the three-point cantilever springs and comfortably accommodate five passengers. The cushions are equipped with Marshall divan springs. The upholstery throughout the car is long grain Duratex. All cushions, including the back and sides, are removable. The one-man top also is of Duratex.

One of the chief aims of the builders has been to maintain the highest standard of quality through the car in both the material and manufacture. This has been carried to the design and finish, the body details and the equipment.

The car has a streamline body which is entirely constructed of steel, with slanting windshield. The full-crowned fenders are of heavy sheet steel. The running boards are covered with linoleum, aluminum bound. The body and chassis are finished in hard-baked enamel. The fittings are nickel and polished aluminum.

The car is equipped with an Auto-Lite two-unit starting and lighting system, headlights with a dimmer, dash and tail-lights, a magnetic speedometer, electric horn, spare tire carrier, extra rim, complete set of tools, tire repair kit, jack and pump. The tires are mounted on demountable rims.

Gray & Davis' New Catalog

The newest catalog of Gray & Davis, Inc., manufacturers of lamps, dynamos and starting motors for automobiles, is being mailed to the trade. This catalog is in three colors and illustrates and describes the new Gray & Davis starting, lighting and ignition systems, as well as a splendid line of automobile lamps.

Every motor car manufacturer and body builder will be interested in seeing this catalog, which will be sent to any reader of THE VEHICLE MONTHLY upon request to Advertising Dept., Gray & Davis, Inc., Boston, Mass. Mention this paper when you write.

Newsy Notes from Cincinnati

Plenty of Carriages Being Made

Cincinnati carriage manufacturers are overwhelmed with business as there is a demand unprecedented in recent years for the buggy and other horse-drawn vehicles. Local factories were never so filled with orders, and it is a problem how to take care of the business that is placed. Never in the history of the Cincinnati carriage business has it experienced such a rush, and the deluge of orders is steadily pouring in.

Prices are now a second consideration with the dealers, and all they request and require is "prompt shipments;" but it is impossible to accommodate them in all instances.

The carriage factories in Cincinnati are, therefore, enjoying one of the best and most prosperous seasons in the history of the business, and it seems there will be no cessation of this state of affairs in this particular territory.

* * *

Supply Houses Very Busy

The supply and accessory houses are also extremely busy, and are doing their utmost to alleviate the congestion of the carriage industry, and are furnishing their goods as rapidly as they possibly can. But this seems to be a rather arduous task, and in numerous cases the accessory houses are toiling night and day to assist the carriage makers in procuring materials to turn out their orders.

Prices of all carriage material are decidedly firm, and from all reports this condition will continue indefinitely.

* * *

Rim Manufacturers' Association

The Rim Manufacturers' Association held a meeting on September 4th and discussed trade conditions. B. F. Van Behren, Evansville, Ind., is president, and F. B. Anderson, Toledo, Ohio, secretary of the association.

Summit Thread Co.

The Summit Thread Co. has leased the fifth floor at 126, 128 and 130 East Fourth Street, and will remove to the new location by October 1st. A. S. Brown, Cincinnati agent, states that this will give them a floor space of 7,000 square feet and will be the means of taking care of increasing business. The Summit Thread Co. is one of the largest cotton thread manufacturers in the United States and enjoys a fine trade in Cincinnati and vicinity.

* * *

Cincinnati Carriage Makers' Club

The September meeting and dinner, which marked the beginning of the fall series of the Carriage Makers' Club, took place at Phillipi's Garden, Westwood, on the evening of Monday, September 8th.

This was one of the most enjoyable events given by the Carriage Makers' Club, as the ladies were invited guests, and whose attendance added grace to the occasion.

There was an attendance of seventy, and under the influences of Prof. John Hofer's orchestra the evening was a very merry one. Besides, Mr. Hunter, chairman of the Entertainment Committee, had a most sumptuous spring-chicken dinner prepared for the enjoyment of the party.

This was the first meeting of the kind where the ladies were invited guests, since the last Christmas celebration of the club.

President Clen Perrine called the meeting to order at 7 o'clock and in his usual affable style and with well chosen words, he extended his thanks to the ladies for their attendance and hoped the innovation would be practiced frequently.

Secretary Wallenstein read the minutes of the April meeting, which were approved. The following applications for membership in the club were presented, and the gentlemen were elected unanimously: Milt Campbell, of The Perkins, Campbell Co., Cincinnati; F. H. Bossemeyer, of the Ohio Top Co., Cincinnati; Robert F. Kroger, of the Ohio Top Co., Cincinnati; Gale B. Smith, manager of the Geo. Delker Co., Henderson, Ky.; Geo. S. Weimer, secretary of the F. A. Neider Co., Augusta, Ky.; Geo. S. Avey, president of the Leather Products Co., Cincinnati; Fred H. Avey, secretary-treasurer of the Leather Products Co., Cincinnati; Frank X. Lothschuetz, of the Victor Rubber Co., Springfield, Ohio.

The following transfers of membership were ordered: J. C. Hobart to J. A. Strong, of the Triumph Electric Co.; Thos. M. Geoghegan to Martin Vold, Jr., of Perkins & Geoghegan.

The question of attending the Carriage Builders' National Association convention was taken up and President Perrine appointed George W. Huston and Clarence Rennekamp to serve as a committee for the purpose of making arrangements for a special car to convey the members to Chicago.

After this portion of the business was dispatched President Perrine called upon W. J. R. Alexander, former secretary of the club, who had just returned from South America, where he journeyed in the interests of his firm, Messrs. Beckwith-Chandler Co., varnish makers, New York.

Mr. Alexander was requested to relate some of his experiences while in the southern continent, and he gave a resumè of his travels, which was enjoyed and was at the same time highly instructive. He spoke for forty minutes and every word he uttered was quickly absorbed. He was requested to continue, but in his modest way informed the members and ladies that "the dance" which was scheduled for the evening's pleasure was in waiting, so the members and their ladies "tripped the light fantastic" until late into the night.

* * *

Cincinnati Automobile Show

The Cincinnati Auto Show opened in Music Hall on September 13th and continued for a week. Never has a local display of automobiles and trucks been given on a grander

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scale and Music Hall had the appearance of a paradise. The management of the various exhibits are to be congratulated for the taste and art displayed.

• • •

Emil E. Hess, manager of the Sayers & Scovill Co., left for Atlantic City September 6th, to attend the convention of the National Funeral Directors' Association.

• • •

Theo. Luth, of Luth Carriage Co., is again at his desk, after enjoying the month of August in Atlantic City with his family.

• • •

George S. Brown, of The Brown Carriage Co., has returned to Cincinnati from his summer vacation spent in Omena, Mich.

• • •

E. B. Silliman, of the fabric department of the United States Rubber Co., with headquarters in Detroit, was in Cincinnati during last month. Mr. Silliman states that trade with his company is exceptionally good.

• • •

James R. Swan, of The Cleveland Hardware Co., has been visiting his customers and friends in Cincinnati. Mr. Swan always enjoys a very nice trade in this territory.

• • •

Carl Kloos, manager of the Enterprise Brass & Plating Co., is rapidly improving after a severe spell of illness.

• • •

Perrin P. Hunter, the popular chairman of the Entertainment Committee of the Carriage Makers' Club, is whiling away most of his leisure time on his farm in Kentucky.

• • •

The business of The Sayers & Scovill Co., makers of the popular "Sayers Six" passenger car, and also makers of auto hearses, is so rapidly increasing that they are considering extensive improvements and larger quarters in the very near future.

• • •

American Pole and Shaft Co. has installed considerable machinery and equipment in its new home at 1347-49 Harrison Avenue, Cincinnati, and already has the order-book filled with business.

The International Tractor Exposition

Having made a series of trips to the tractor factory cities during the past several weeks, M. B. Mawby, manager of the International Farm Tractor and Implement Exchange, believes that the exposition scheduled for October 15 will open most auspiciously with a thoroughly representative line of tractors and implements.

This exposition is to be one of the eight permanent industrial exhibits of the Merchants' & Manufacturers' Exchange in Grand Central Palace, each of which will occupy an entire floor—50,000 square feet of area. Manufacturers and selling agencies of farm tractors, harvesting machinery, agricultural water works, silos and the like will be represented.

The fame of this enterprise already is spreading throughout the world, and the Grand Central Palace is destined to become a mecca for buyers, both domestic and foreign. It is the first time such a venture has been attempted, but its success is absolutely assured by the caliber of the backing of the enterprise. To this great clearing house will come inquiries from many parts of the world where farm machinery and other commodities are desired.

Concerns both large and small, whose products will stand the minutest examination and comparison, may secure space in the various permanent expositions at a very moderate price per annum.

Manufacturers, dealers, jobbers, engineers, and others visiting New York will constantly stream in and out of the huge building to inspect the latest and most improved devices and machines in the particular lines in which they are interested, and this will afford an opportunity for manufacturers to interest customers in their products by direct contact.

The new enterprise enjoys phenomenal backing. The Nemours Trading Corporation, of which Alfred I. du Pont is president, owns and controls the Merchants' & Manufacturers' Exchange of New York. It has branches and selling agencies in all of the leading cities of the world.

Semi-Trailers in Grocery Trade

A fleet of twenty five-ton tractors and thirty-seven six-ton semi-trailers handles deliveries of groceries to the chain stores of the Atlantic & Pacific Tea Co. throughout the State of New Jersey from the Jersey City warehouse. The tractors are of five tons capacity and each trip averages about forty miles, with stops at about forty stores. Two trips are made per day.

Standard motor trucks proved uneconomical in this service because of the time lost while loading. By the use of semi-trailers the waiting time of the tractor and its driver has been reduced from two hours to only eight minutes. The tractors start on their first trip in the morning with loaded semi-trailers and while they are on the road eight or ten other trailers are being loaded at the warehouse platform. When the tractors return, an average of only eight minutes is required to attach the loaded trailers ready for the afternoon trip. Jacks are used for raising the front end of the trailers to disconnect them from the tractors and lower them on wooden horses ready for loading, but the company is planning to install an overhead lifting system which will be an improvement on this method.

For supplying its 3,900 chain stores throughout the country, the company operates 108 motor trucks and tractors in ten different cities and delivers nearly 200,000 tons of groceries a year with them. The prompt, certain and economical daily distribution of supplies to these retail stores by means of the tractors and trailers insures quick turnover of stock and is an important element in the success of doing business on the low retail price plan.

World Market for American Automobiles

From the fact that 87 per cent. of all the automobiles in the world are in the United States, there are two positive conclusions—that there is a huge foreign market as yet unsupplied and that the United States is the logical country to supply it. Adding to this the acknowledged condition that other automobile-producing countries cannot meet the demand in their home markets for five years to come, and it is evident that American manufacturers have a wonderful opportunity for foreign business.

Commerce reports and communications from abroad constantly call attention to the crying need of cars from practically every quarter of the globe—China, India, South America, Switzerland, Australia, Nigeria, Mexico and nearly all of the countries of Europe have been mentioned specifically in recent consular advices. The lack of good roads is the main impediment to more extensive use of cars abroad, but road improvement is being agitated everywhere that motor transportation is so sorely needed.

By virtue of being nearer the sources of most of the raw materials and producing in quantities American manufacturers can deliver, even against the handicaps of freight and import duties, a product that performs as well or better and costs less than that produced in any other country. Hence the American car is bound to appeal to the common sense of any business man whatever his allegiance nationally. People everywhere will buy anywhere to get what they want. It is human nature and no amount of argument or appeal to sentiment will change it. Those who want the most motor car for the price are fast learning that the only place to get it is the United States.

Trailers in Motor Express Work

Operators of intercity and rural motor express lines are beginning to use trailers with their trucks as a means of making their operations pay better profits. The following chief advantages are claimed for the use of trailers:

They double the hauling capacity of each truck; one driver handles the double load, there is a saving of about 80 per cent. in the cost of hauling the extra load; trailers take care of excess shipments in the busy season; it is much cheaper to lay up the trailers in dull seasons than to let the trucks stand idle; overloading of trucks is avoided.

Waiting time of trucks and drivers is saved while trailers are being loaded and unloaded.

The loaded trailer can be left at an intermediate point for loading or unloading while the truck proceeds to its own destination, the trailer being picked up on the return trip.

Smaller and cheaper trucks haul the same tonnage with trailers or semi-trailers as trucks of double their capacity. This is important where roads are poor and heavy trucks get stalled.

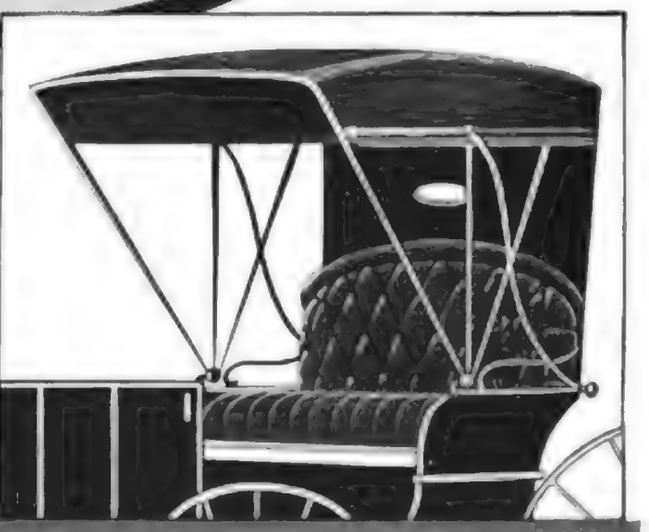
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THE NC-3 ARRIVING AT PONTA DELGADA

YOU will recall how the NC-3 was forced to the surface of the sea on her way from Newfoundland to the Azores—

How she fought a bitter sea for fifty-five hours.

How under her own fighting power she finally taxied into Ponta Delgada, her wings torn, but with her engine still intact and protected, and her brave crew safe.

Remember?

Where would she have been with leaky pontoons? Instead of a heroic trip to rescue, we should have heard of a tragedy, had it not been for a thin layer of mouldable waterproof plywood.

But the veneer that took all that battering and asked for more was no ordinary product.

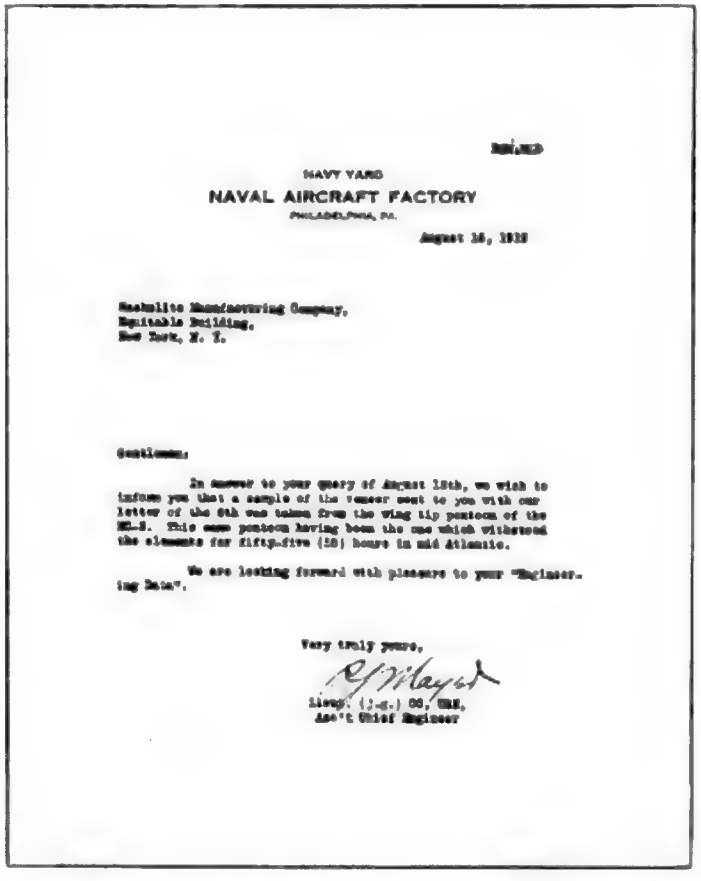
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August 16, 1919

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Equitable Building,
New York, N. Y.

Gentlemen:

In answer to your query of August 12th, we wish to inform you that a sample of the veneer sent to you with our letter of the 6th was taken from the wing tip pontoon of the NC-3. This same pontoon having been the one which withstood the elements for fifty-five (55) hours in mid Atlantic.

We are looking forward with pleasure to your "Engineering Data".

Very truly yours,

Lieut. (J.G.) CC, USN,
Asst. Chief Engineer

USERS of Haskelite in the vehicle industry—there are now over 600 of them—will understand the terse tribute the Navy here pays to the strength and "specified performance" of Haskelite. Full engineering data on its manufacture, use and finishing and complete current quotations will be furnished you on application to the

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Factories: Grand Rapids and Ludington, Mich. Capacity 30,000,000 feet a year.

Mouldable Plywood

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How They Do It in England

(Continued from page 30)

struction which does suit him, while at the same time the manager must keep up a cheerful exterior and give the impression that nothing is really more pleasant than shifting a body away from the bench to make room for the framework of another.

The manager must, for his own peace of mind, keep an eye on the stock of material in hand. A new batch of bodies demands stuff of a certain thickness, and it will mean a visit to the timber merchant, since he does not see why the mill should be busily occupied in slabbing done stuff when it ought to be doing its legitimate work of cutting out timber with a minimum of waste.

Timber, however, is one item among the many, and he has his hands pretty full in keeping the management advised of his requirements in this direction.

If he is a wise man he seldom interferes with the bodymaker once the general design is settled, but when several bodies of the same pattern are being made, it is quite likely that he will suggest modifications after the first one has been built. With any job he will have to decide the exact disposition of extra seats, wind screens, and other items, usually grouped under the head of "finishing"—all those details which have such a telling effect on the completed article.

His chief anxiety, as already mentioned, is how to get on with men themselves. He has to interview the applicant for a job, decide his rate of pay (although this is a rather cut-and-dried affair just now with the skilled worker). He has to listen to their complaints and suggestions, and when the workman desires to make a change in the middle of the week he has to take it all as a matter of course, and see that there is enough petty cash available to pay him up.

Closely allied to the labor problem is the cost of the work in progress. The foreman has to continually consult the time cards or sheets to see that the body is not becoming unduly expensive, and, as he becomes experienced so he will be able to value a body in any stage of progress, and mentally calculate its value to within a pound or two. His job is no sinecure, especially at the present time, when factories are changing over from repetition work done by the piece to work of varying character done by the time system. He hopes for the day when his firm will specialize in but a few types of bodies, so that the different departments can be properly organized on an economical basis, and a steady rotation of work maintained.

We are all faced with the problem of obliging the old customer who wants a special body, but these jobs, if different from the ordinary run of work in the shop, seldom pay, owing to the amount of disorganization entailed, and the special attention which has to be devoted to them.

Probably, as time goes on, we shall have the trade divided up into two sections, those who specialize in one or a few types of bodies, and those who do any kind of job. The specializing firm will be the large and medium-sized establishment, while the firm which is prepared to take any job offered will be a small one.

Traffic Truck Factory Again Enlarged

The Traffic Motor Truck Corporation of St. Louis, Mo., which recently built a large plant with a capacity of fifty trucks per day, is now building an addition to its present plant at 5200 North Second Street, St. Louis. The new building being erected will cover the block adjacent to the present Traffic plant, between Withers and Talcott, Second and McKissock Streets. The Traffic Company moved into the plant which they now occupy last April and this is the second addition they have made in the past four months.

In May the machine shop was enlarged but the demand for Traffic trucks has increased to such an extent that the present factory facilities are inadequate to meet the demand. The new building is now under way and will be of modern brick construction, 150 x 200 feet, affording 30,000 square feet of floor space.

Our Baltimore Agent

Mrs. J. E. Hemmell, widow of the late Joseph E. Hemmell, who, since the death of her husband, has been acting as subscription agent for THE VEHICLE MONTHLY in Baltimore, announces her return to her home, 915 Carey Street, Baltimore. Mrs. Hemmell is a capable business woman and for a long time previous to her husband's death had assisted him in subscription and collection work.

Tool Designers

Three expert mechanics wanted for high grade permanent positions. Must be qualified for tool design work.

NORDYKE & MARMON CO.
Kentucky Ave. & Morris St.
INDIANAPOLIS, IND.

Stronghold Tires to Double Output

The Rubber Products Company, Barberton, Ohio, makers of Stronghold Tires and Tubes, have announced that they are in the process of developing a manufacturing program which will double their output.

The demand for Stronghold Tires and Tubes, according to a representative of this company, is increasing by leaps and bounds in all parts of the country, and the twenty-two years' experience, which the Rubber Products people have had in the rubber manufacturing business, is proving a real asset in the trade development.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 60 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

AN A No. 1 body builder, draftsman, designer and engineer, familiar with best methods of production, desires position as superintendent or designer. Address "Da," care THE VEHICLE MONTHLY, Philadelphia.

AUTOMOBILE body factory, building very high grade work, desire a man thoroughly familiar with high-grade body building from beginning until same is mounted on chassis, to act superintendent. Must have wide experience and up to the minute in production, quality, style, etc. A good opportunity for the right man. Address giving full particulars, experience, etc., "Q" care THE VEHICLE MONTHLY, Philadelphia.

AUTOMOBILE BODY DRAFTSMAN AND DESIGNER WANTED. Experience and ability necessary. Address "Y," care THE VEHICLE MONTHLY, Philadelphia.

FOR SALE. Large Singer dash stitching machine. Perfect order. Price, $75.00. THE GREGG-WM. D. ROGERS CO., 1626 Arch St., Philadelphia.

WANTED. A live salesman to sell truck bodies in Western territory which have many patented features. Liberal commission. Address all communications to THE DENGSTHOM-BICKWSTER COMPANY, Denver, Colo.

WANTED. A first-class paint tester, to take charge of that character of work in a large paint concern. First-class salary paid to the right man. Address, giving experience, references, etc., "Y50," care THE VEHICLE MONTHLY, Philadelphia.

WANTED. A paint mixer, one thoroughly experienced. First-class salary paid to the right man. State experience, references, etc. Address "Y52," care THE VEHICLE MONTHLY, Philadelphia.

WANTED. High-class painter capable of taking charge of small production of paint shop. Top salary stands work for high-class man with splendid opportunity to develop with fast growing business. Answering please state wages desired to start, age, experience and nationality. MICHIGAN BEARING & MOTOR CO., Grand Rapids, Michigan.

WANTED. Paint and trim shop superintendent. Must have experience on closed automobile bodies and be familiar with up-to-date large production methods. Give full information, regarding experience, qualifications, salary expected etc. in first letter. Location Middle West. Address "Y49," care THE VEHICLE MONTHLY, Philadelphia.

WANTED AT ONCE. Experienced body draftsmen, also men for all trades applying to the automobile body industry. Get in on the ground floor of a new branch of our organization. Reply to Assistant Engineer in charge of automobile bodies. OSGOOD BRADLEY CAR COMPANY, Worcester, Mass.

POSITION WANTED. By a first-class draughtsman and designer in a large automobile plant. Have learned the trade from the bottom, can build bodies, make estimates, etc., and also have a full knowledge of trimming and painting. Am familiar with building bodies singly or on the wholesale plan. Address "Y56," care THE VEHICLE MONTHLY, Philadelphia.

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Manufacturers of

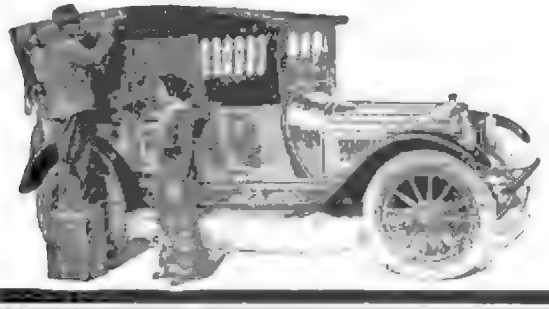
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With West's Automobile Top Dressing

8 FACTS:

1. Especially prepared for all kinds of leather, mohair, cravenettes, etc.
2. Will not crack or injure the finest material.
3. Waterproofs the material—extending its life.
4. Retains the flexibility of the goods.
5. Equally good on upholstery.
6. Is jet black and has a good body.
7. Contains no alcohol, shellac or lampblack.
8. We've made this top dressing for 50 years.

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L. M. WEST'S SONS 230 BROADWAY ROCKFORD, ILL., U.S.A.

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Welds that make the repaired axle, tire, crank shaft, or other motor or wagon part stronger than the original, can be easily made with

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They weld at a low heat, saving fuel and labor. One to one hundred welds from a plate. No waste

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Note how this Spring Hanger Adds to the Truck's Life

The front spring hanger of a truck appears to be a minor detail. In reality, it is a vital engineering point. Its design actually influences the very life of the truck.

Gramm-Bernstein front spring hangers are not extensions of the frame side-members. We use a heavy cast steel hanger.

The same care and engineering skill which B. A. Gramm applies to this one thing is evident throughout the Gramm-Bernstein truck.

One of the results we get is a much stauncher front end, far less liable to serious damage.

Another is increased loading space back of the seat, on a proportionately shorter wheelbase, and a better load distribution.

Most important of all, this better load distribution makes the truck steer better, pound less on the road, and therefore last longer.

It is obvious that Gramm-Bernstein's greater loading space increases the truck's usefulness as a freight carrier.

It is equally obvious that our comparatively shorter wheel-base adds greatly to tractive efficiency and to economy, and gives a shorter turning radius.

In other words, these are exactly the results a business man wants in his truck.

Gramm-Bernstein Trucks in 2, 2½, 3½ and 5-ton capacities, are now sold completely equipped, ready for the body—not an extra to buy.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Patent Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194994.

The Gramm-Bernstein Motor Truck Co.

Pioneers Since 1901—Builders of the First Liberty (U. S. A.) Truck

Lima, Ohio, U. S. A.



THE big question in selecting a truck tire is not mileage, but *resiliency*.

The principal function of any truck tire is to cushion the truck—to take up road shocks which would otherwise put the engine and chassis out of commission in a short time.

If tires do not save a truck they are a poor investment, no matter how much mileage they give.

Kelly Caterpillars are guaranteed for 15,000 miles—5,000 more than other truck tires—but the thing that interests truck owners is the fact that the great depth of rubber and the side vents, which allow the rubber to expand under load pressure, make Caterpillars almost as resilient as a properly inflated pneumatic tire.

KELLY-SPRINGFIELD TIRE CO.

Gen'l Sales Dept., 4614 Prospect Avenue

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CATERPILLAR TREAD

Everybody's Happy



The Manufacturer—
Because his vehicles wear better, look better and sell better when their value is increased by Firestone equipment.



The Dealer—
Because Firestone gives him the profit in light weight, the value of good measure size and the convenience of standard design.



The Carriage Owner—
Because of easy riding; long, strong wear and elegant looks. They wear long and evenly, clear down to the channel.

Full Size—Light Weight—Standard Design *Send for full information*

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IT BRINGS BUSINESS

Body Builders will find users of dumping trucks very enthusiastic over a demonstration of the

TRADE HORIZONTAL HYDRAULIC MARK **Dumping Unit**

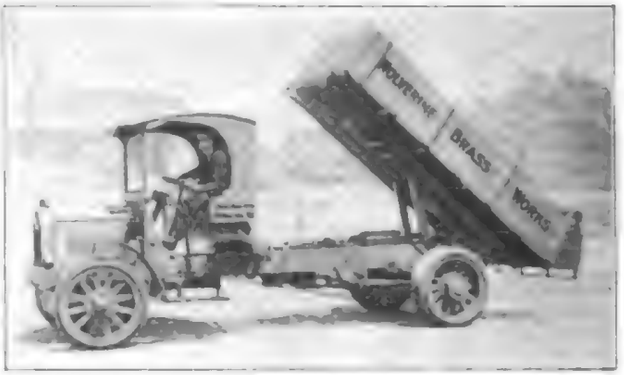
Get an agency and secure two profits—a very liberal one on the Unit and your regular profit on the body which you can build.

The Horizontal Hydraulic Dumping Unit enables full length bodies to be used, the usual 18" of waste loading space just back of seat being saved.

No ropes, rope clips or sheaves required. No interference with ground clearance of chassis.

No portion of hoist higher than chassis seat.

Write for further interesting particulars



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Hand Hoist for Ford Truck

(Patents Pending)

TAKES no room back of cab, is easy of operation, simple and neat in appearance.

Shipped on sub-frame, ready for mounting on chassis. Easiest for the body builder to install and best—because it always makes a satisfied customer.

Write for photos and blueprints.

Truck Engineering Company

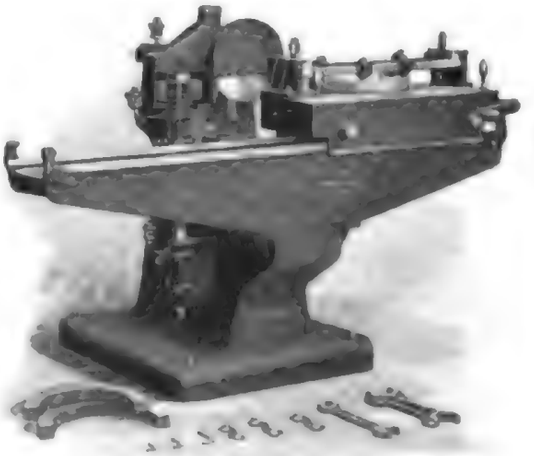
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Government Sale

11,150 Wagon and Cart Axles

Sealed bids will be opened 10 A. M. October 10, 1919, at Zone Supply Office, Jeffersonville, Ind. Particulars, special bid forms may be obtained upon application to Zone Supply Office, attention Surplus Property Officer, following cities: New York, Philadelphia, Boston, Baltimore, Newport News, Atlanta, Chicago, St. Louis, New Orleans, San Antonio, Omaha, El Paso, San Francisco. Refer to S. P. D. No. 5243 M. V.

Steering Wheel Rim Equalizer and Jointer



DEFIANCE

STEERING WHEEL RIM MACHINERY

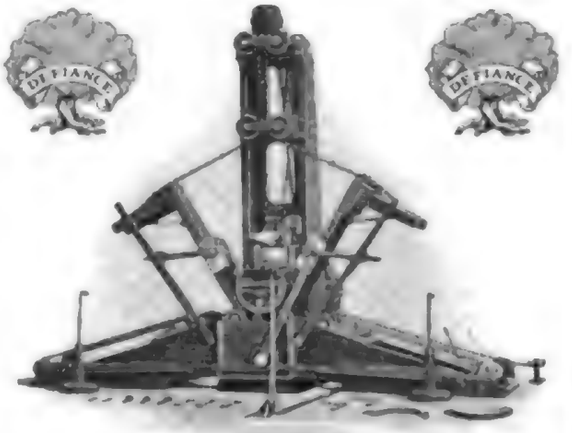
There's a Defiance machine for every operation necessary to make steering wheel rims. Beginning with blanking the stock—it bends the half rim sections—equalizes and joints the half rim sections—shapes the jointed rim—scrapes and polishes the shaped rims.

Each machine is of a special design, which in use has proven itself successful by accomplishing its respective operation accurately with a big daily out-put, and in addition reduces material wastage to a minimum. These machines are illustrated and described in circulars, which we will mail on request.

THE DEFIANCE MACHINE WORKS

Defiance, Ohio, U. S. A.

NEW YORK ***LONDON***

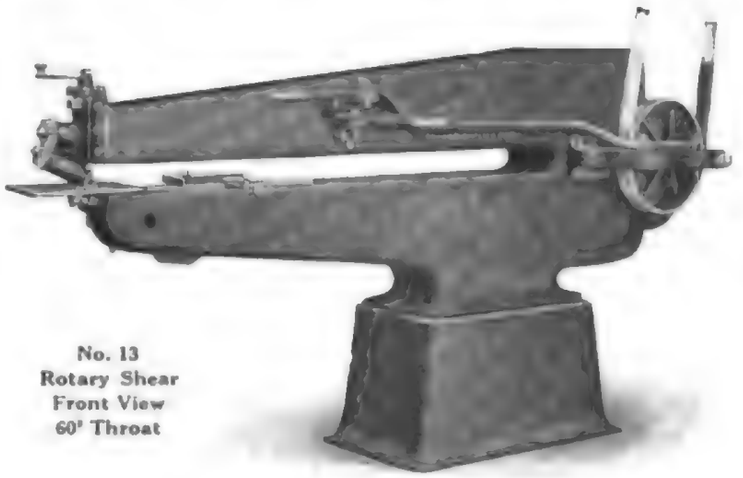


Steering Wheel Rim Bending Machine

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ANTICIPATE YOUR ORDER FOR

PETTINGELL STANDARD MACHINES



No. 13
Rotary Shear
Front View
60" Throat

Place your order now for future delivery of our wood and metal machines.

You are going to need them

We make a 30"-throat cutter same style as our 60" shear and in addition to these a Trimming cutter with 30" throat and a Special Heavy Trimming Shear to cut up to 1-8" stock—16" throat.

Write for catalogue and prices

PETTINGELL MACHINE COMPANY

AMESBURY, MASSACHUSETTS

Trailmobile

Trade-Mark Reg. U. S. Patent Office

The Motorless Motor Truck

Thousands in Use

SIZES
1,250 lbs.
1,500 lbs.
2,000 lbs.
3,000 lbs.
4,000 lbs.
5,000 lbs.
10,000 lbs.
Also semi-trailers

Bodies for every business

Contractors to the U. S. Government.

Demand, Good Profit, Small Service Cost

THERE are three big reasons why it will pay some live dealer well to handle the Trailmobile in your territory.

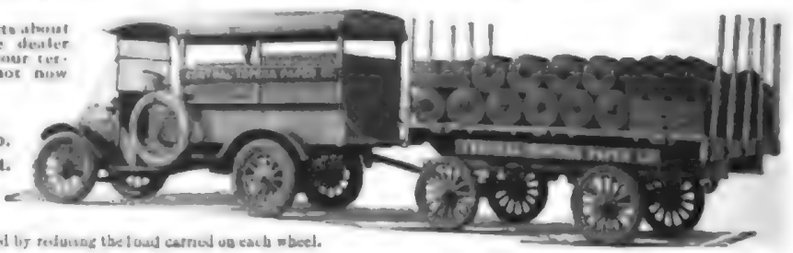
The demand is there. Trail hauling is the biggest idea in road transportation right now. The army proved its possibilities. Thousands of Trailmobiles in actual use have produced astounding results—and are greatly increasing the demand. National advertising on a big scale is doing its work.

It is an easy, pleasant line to handle. There is no trouble after the sale—practically no service expense. The Trailmobile is probably less expensive to handle than any line you carry.

The margin on the Trailmobile is the same as the most desired cars and trucks—and expense is so low it is practically all profit.

Write for the facts about the Trailmobile dealer proposition in your territory if it is not now sold there.

The Trailmobile Co.
574 E. Fifth St.
Cincinnati, O.



Good roads are preserved by reducing the load carried on each wheel.

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TRADE S.W. MARK

Specialties

in Steel

Suggestion No. 3 will lend a thought on what is called a Duplex Demountable concealed auto hinge.

Manufacturers who use hinges or those who have use for similar parts will find in this suggestion an article of real thought as to the manufacturing. Very simple in construction and easy to install.

If specially interested in hinges of this type, they are made in 2 sizes—7¾" and 8¾" long.

Not usually carried in stock—it is preferred to make them in quantities to order.

Refer letters to Dept. V. M. 3

Special Productions Department

THE STANLEY WORKS

NEW BRITAIN, CONN.

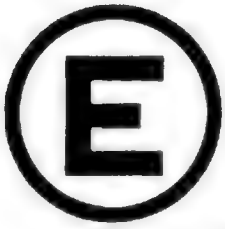
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100 Lafayette St

Chicago
73 East Lake St.



"Specialists in Wrought Steel Specialties"

Millions of Magazine Tubes and Fillers were made by The Stanley Works during the war for the U. S. Government



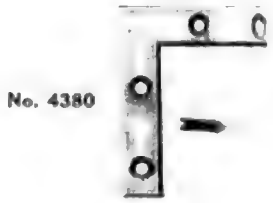
IRONS NEEDED IN THE CONSTRUCTION OF THIS BODY

Size A, Straight End			Size B, Curved End	
1 set	No. 5692	Acme Door Lock	1 set	No. 5692
6 pieces	9515-E	Door Hinges	4 pieces 2 pieces	9515-E 9515-H
1 pair	6137-A	Rear Post, Inside Body Braces	1 pair	6136-A
6 pieces	6135-C	Side Post, Inside Body Braces	6 pieces	6135-C
6 pieces	4426-D	Roof Rail Corner Irons	6 pieces	4426-D
1 pair	6220-B	Rear Post, Top Rail Corner Irons	1 pair	6220-B
2 pieces	4380-B	Top Rail Corner Plates, front	2 pieces	4380-B
4 pieces	4485	Body and Chassis Connections	4 pieces	4485

EMCO MALLEABLE IRONS

Write for our Bulletin
"ASSEMBLIES OF IRONS"

This page illustrates one of these assemblies, showing our stock irons and their application on a standard job.


No. 4380


No. 9515

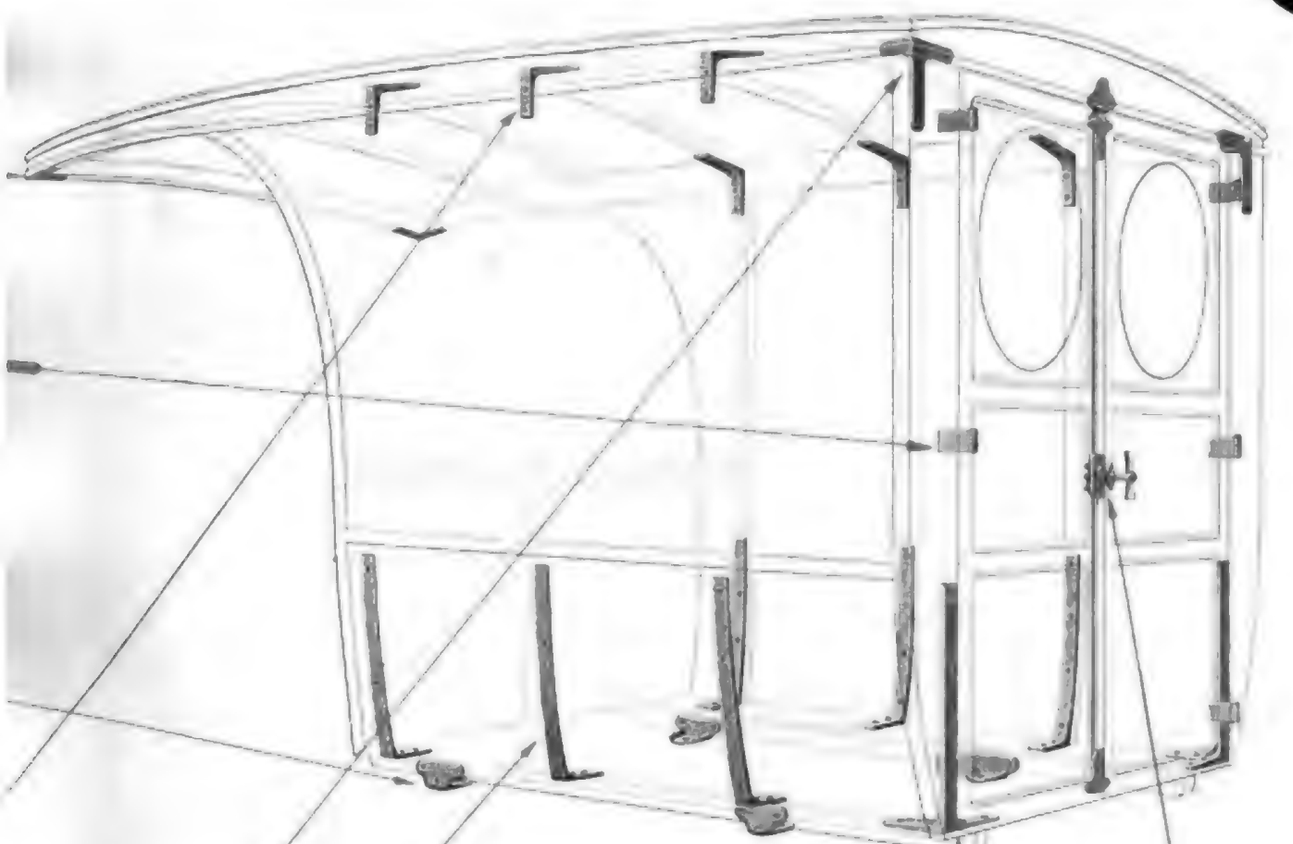

No. 4485


No. 4426


No. 6220

The Eberhard Manufacturing Company

CLEVELAND, U. S. A.



SET No. 1

FULL PANEL BODY, CURVED SIDES

BODY TO FIT ON REAR OF FORD ROADSTER BODY



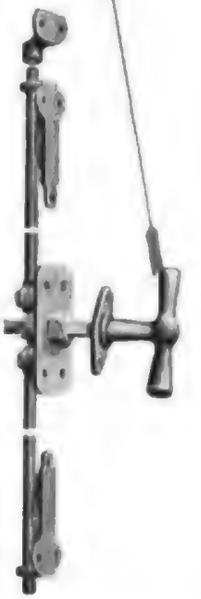
No. 6135



No. 6136



No. 6137



No. 5692

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MADE IN 7 SIZES

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FLOOR SPACE
POWER BILLS
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INCREASES
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QUICKWORK ROTARY SHEARS are used all over this and Foreign Countries by the largest manufacturers of Automobile Sheet Metal Parts.

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COMPLETE INTERIORS—from beautiful fabrics down to silk-covered tacks. Laces, curtains, tassels, roberails, robes, carpets. We have specialized in interior decoration for 80 years. America's leading automobiles are furnished with—

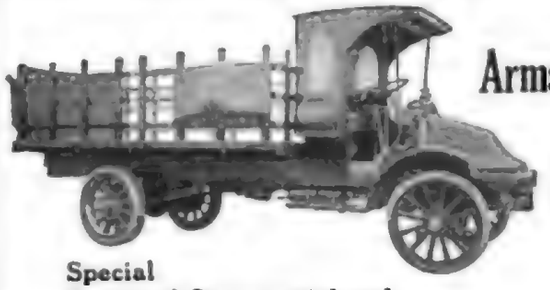
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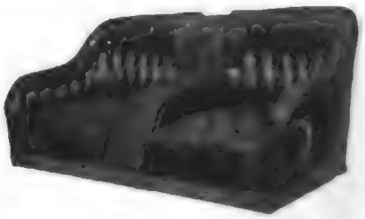
Let us present details. We invite correspondence from dealers and manufacturers interested in distinctive interiors.

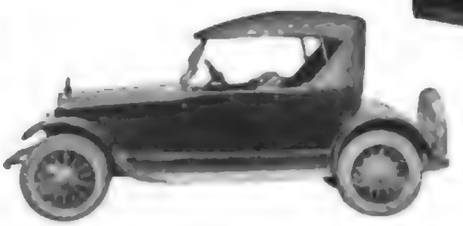
Our Decorative Department will gladly suggest an interior, or cooperate with you in order to secure an interior exactly suited to your individual requirements.

The Bridgeport Coach Lace Company
BRIDGEPORT CONNECTICUT



THE
Armstrong-Johnston Mfg. Co.
COLUMBUS, OHIO





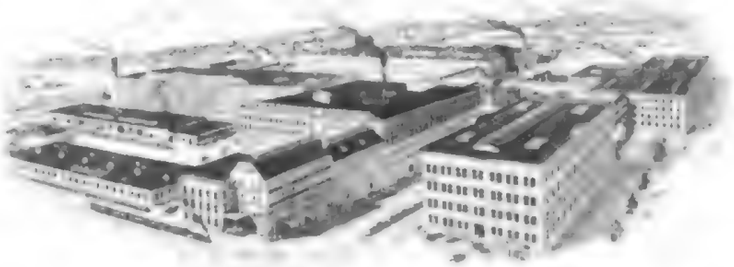
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HEAVY DUTY TRUCKS

FINE PANEL DELIVERIES

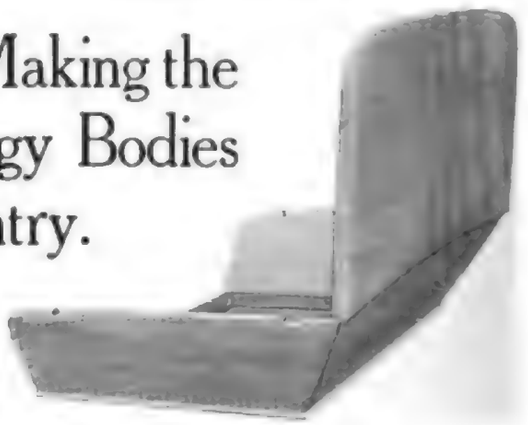
BUSES AMBULANCES

FUNERAL BODIES

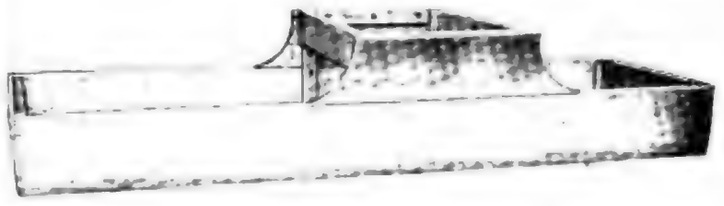
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Our Products are Quality. Deliveries Always Prompt and Our Prices Attractive



We Solicit Inquiry and Will Quote Promptly



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INCORPORATED
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JENNINGS PATENT AUTOMATIC DUMP BODY

Make it a real interesting seller

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A very clever but simple lever device enables one man to dump the load in ten seconds.

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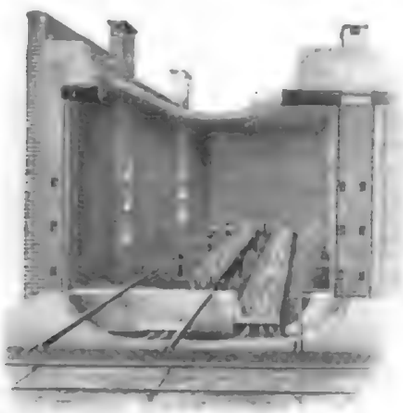
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It Dries Oak Green FROM THE SAW

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It also dries all other kinds of lumber, from the lightest of soft wood for panel work to heavy green hickory billets for motor truck spokes.

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VENEERED ROOF PANELS

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GLUED WITH WATERPROOF GLUE or HIGH GRADE HIDE GLUE

Wagon Side Panels
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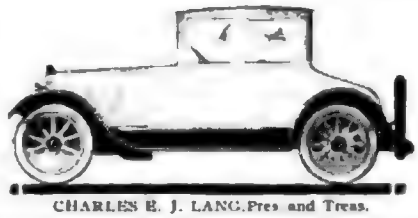
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MANUFACTURERS OF



Automotive Bodies



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Regular Length, 7 Inches

Use No. 314 "Eagle Draughting" in your Draughting Department.
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THE BEST



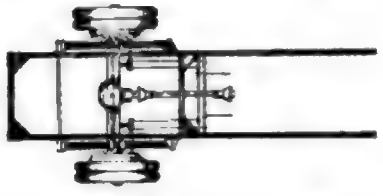
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"NEW EASY" Nos. 0, 1, 2, 3 — Porter's name on all genuine tools

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LUVERNE TRUCKGEARS

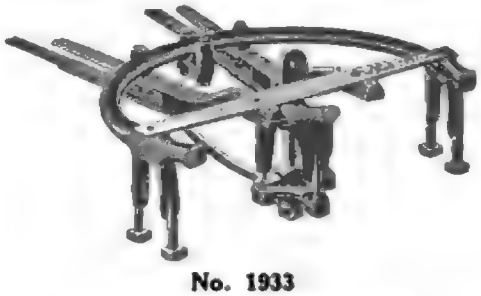
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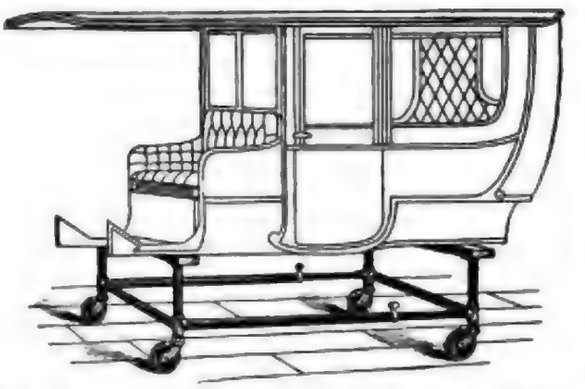
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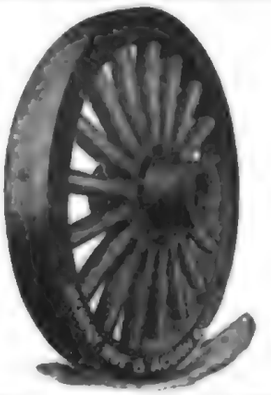
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Brake Band
Brake Band Guides
Brake Band Support
Brake Disc
Brake Drums
Brake Pedal Bracket
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Caps, Hub
Clamps
Clips
Clutch Coil Cups
Clutch Cones
Clutch Disc
Clutch Driving Spider
Clutch Drums
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Engine Hangers
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Equalizing Bars
Fan Blades
Felt Retainers
Float Levers
Flanges, Hub
Gauge Cups
Grease Cups
Hand Oil Covers
Hangers, Step
Hinges
Hood Supports
Horn Bracket
Horn Projectors
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Housing, Covers
Hubs, Wire Wheel
Hub Caps
Lever Sectors
Locking Plates
Muffler Brackets
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Name Plates
Oil Filler Caps
Oil Hole Covers
Oil Pans
Pinion
Running Boards
Shims
Spring Links
Stanchion
Step Hangers
Tank Straps
Throttling Sectors
Tire Brackets
Toe Board Binding
Toggle Links
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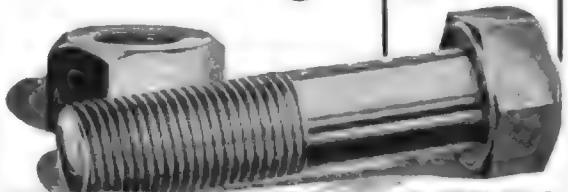
632 CHESTNUT STREET
PHILADELPHIA

The leadership of Russell, Burdsall and Ward in the bolt and nut industry has its basis in seventy-four years of honorable dealing

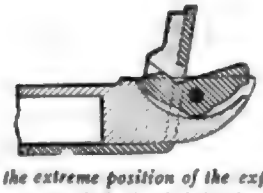
BOLTS EMPIRE NUTS-RIVETS

Since
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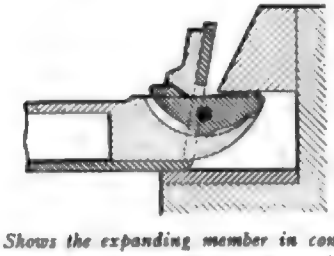
This company has been making the highest grade bolts and nuts in the world for nearly three quarters of a century. In that time it has developed manufacturing and shipping facilities which have no duplicate in the industry.



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BOLT & NUT COMPANY
PORT CHESTER, NEW YORK
Makers of Bolts, Nuts and Rivets Since 1845



Shows the extreme position of the expanding member and the latch bolt when door is open.



Shows the expanding member in contact with the inner bearing surface of the striker and having taken up all the clearance between it and the door stop when door is closed.

"SEARS-CROSS LOCK"

FOR AUTOMOBILE DOORS

"The Lock With the Expanding Latch"
(Manufactured under the Ottinger Patents)

It Prevents Rattling of Doors
Insures Positive Safety Protection Against Doors Opening Accidentally
Overcomes Present Difficulty in Opening and Closing Doors
and
Automatically Takes Up Wear

The outward pressure of the rubber stops is taken care of by the inward pressure of the Expanding Latch which holds the doors tight so that they cannot rattle. The holding pressure is supplied by the lock and not by the rubber stops.

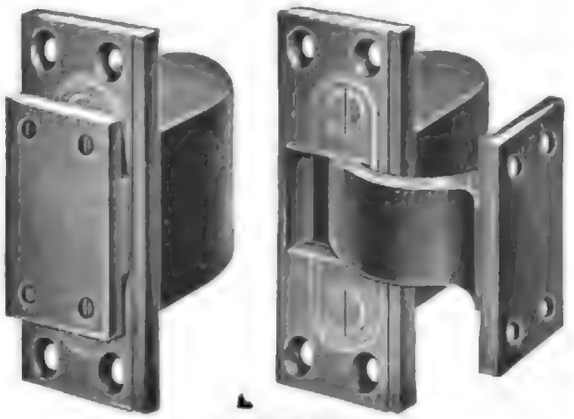
The only perfect automobile door lock. Brings about economy in cost of installation. Made for all priced cars, open and enclosed bodies.

SEARS-CROSS CO.

Bush Terminal, Brooklyn, N. Y.

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About Concealed Hinges



Style No. 802

WE HAVE manufactured for years a Concealed Hinge with drop forged steel hook, and a drawn brass non-rusting case. One of our designs is shown in the accompanying illustration, and we desire to inform the trade that all Concealed Hinges we make are fully protected under U. S. Patents owned by us. We will protect all users of our Automobile Door Concealed Hinges, or for that matter on any other goods which we may manufacture and offer to the trade.

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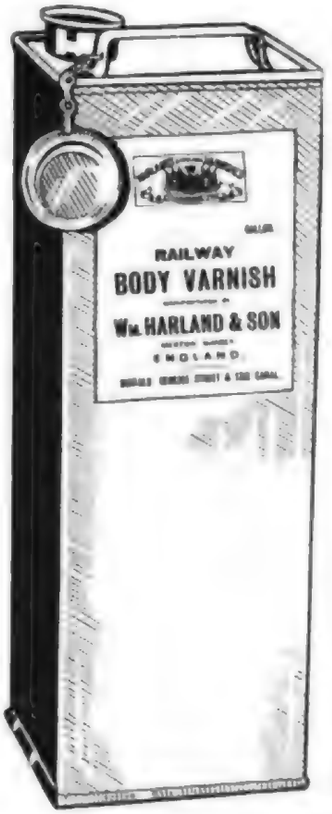
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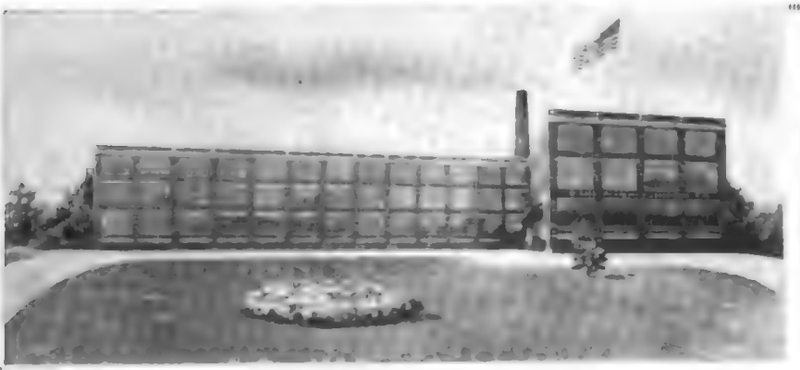
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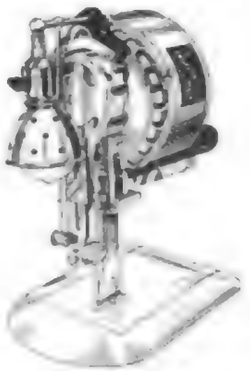
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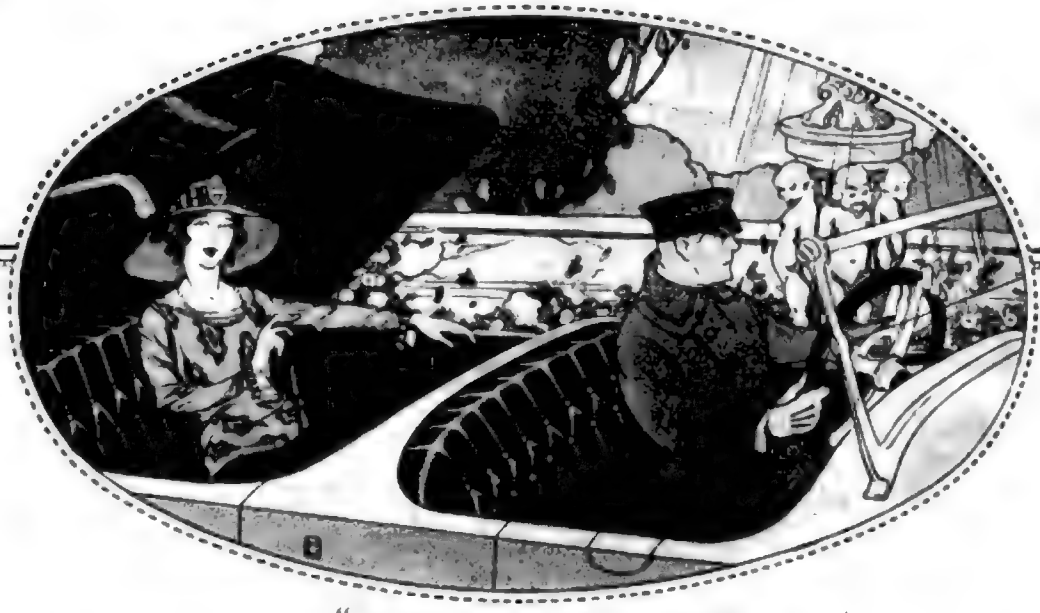
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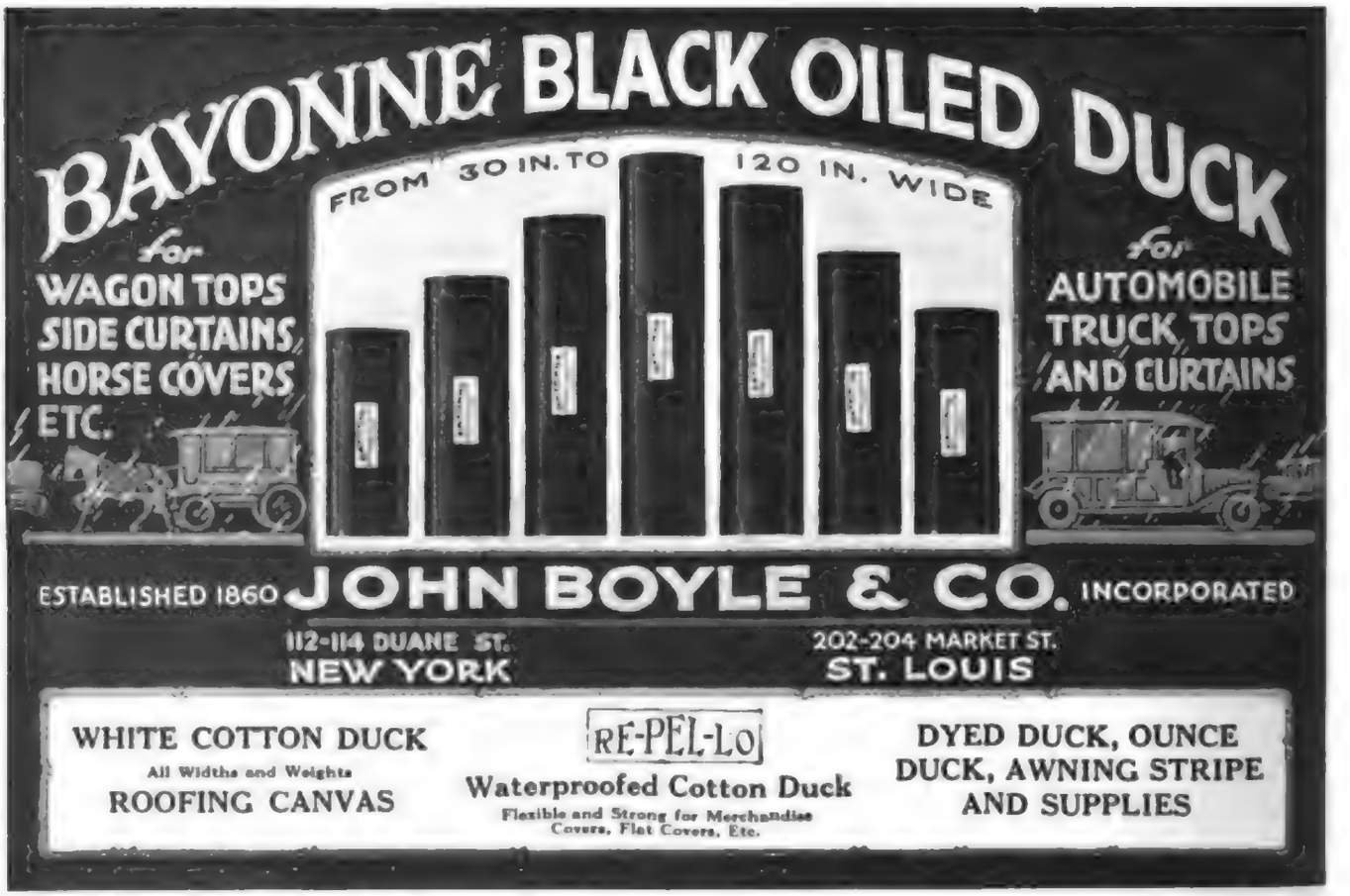
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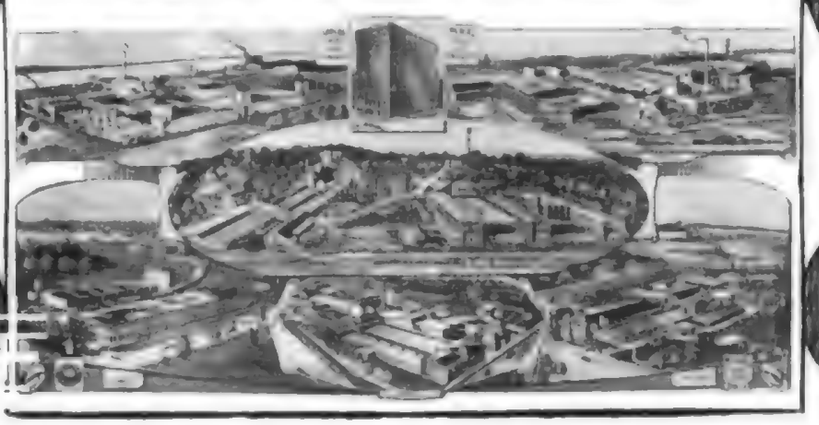
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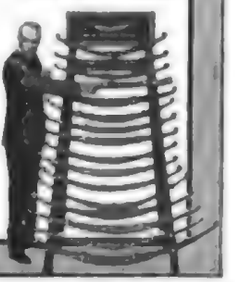
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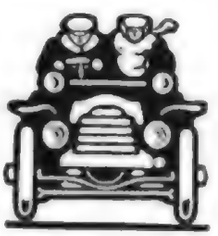
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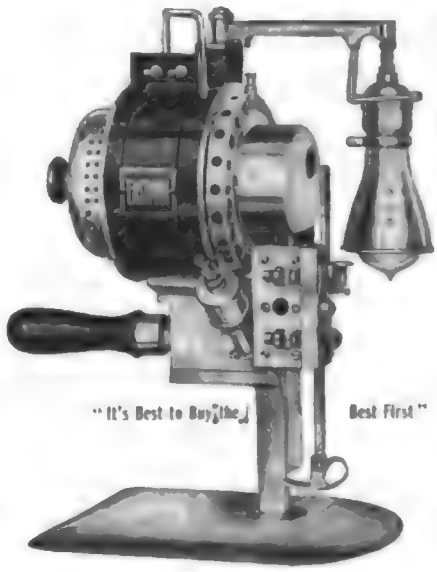
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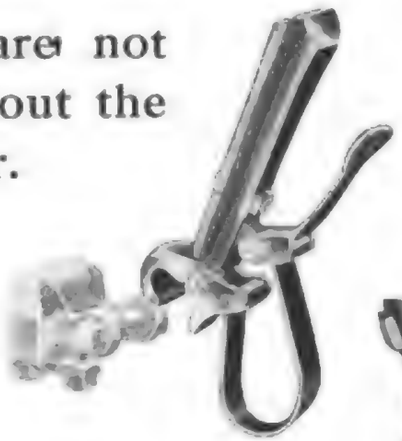
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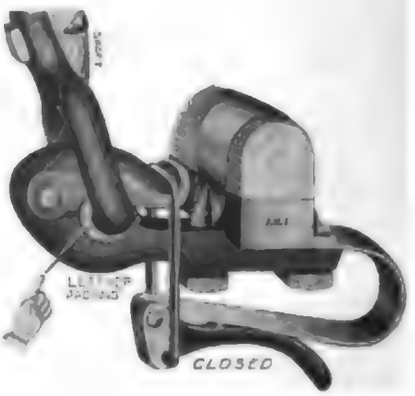
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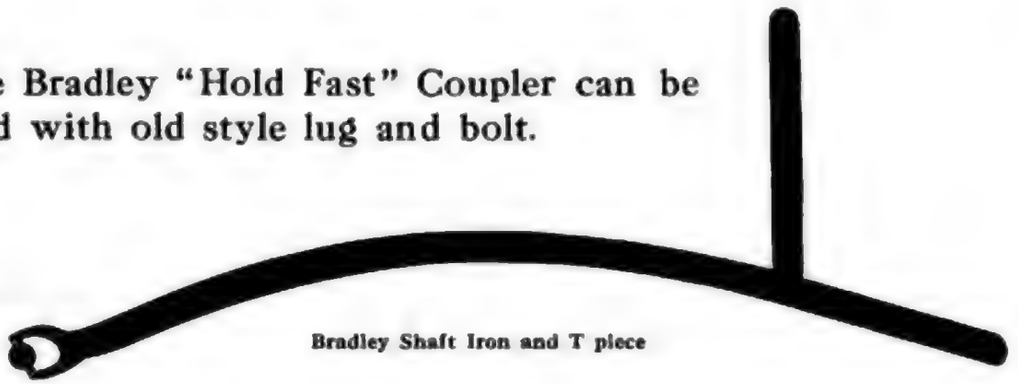




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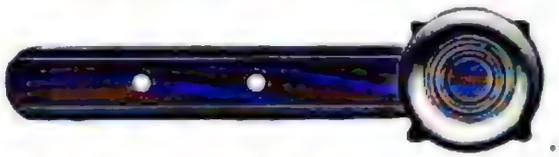
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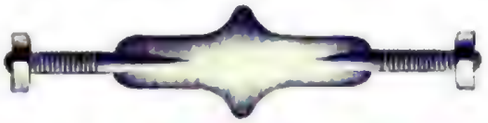
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VOL. 55 - No. 8 NOVEMBER, 1919

THE VEHICLE MONTHLY

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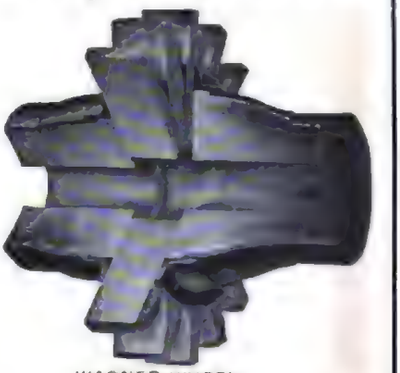
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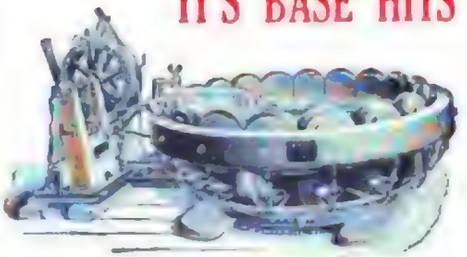
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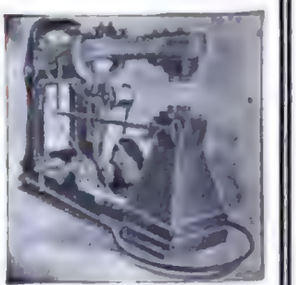
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THE VEHICLE MONTHLY

PUBLISHED FOR 54 YEARS AS

THE MAGAZINE FOR VEHICLE MANUFACTURERS

Published Monthly by
WARE BROS. COMPANY, PUBLISHERS AND PROPRIETORS.
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THE VEHICLE MONTHLY is a member of the A. B. C.

Vol. 55, No. 8 **PHILADELPHIA, NOVEMBER, 1919** **Subscription Price $2.00 Per Year**

A Square Deal for the Traveling Man

Seldom in the history of our nation has the need of safe and sane legislation been more acute than at present. The administration of the country's business, large and small, with especial emphasis upon maximizing production, should not be colored by shortsighted or unwise partisan activities.

The vote of the thinking man on matters of national concern is a stabilizer most urgently needed today, and any project which aims to correctly register the preference of intelligent, conscientious citizens in the matter of who will represent the nation in Washington or at the State capital, should appeal to business men who are not indifferent to the labor unrest throughout the country.

A readjustment period is always perilous and universal labor unrest aggravates the danger of unsound radicalism creeping into legislative action.

A most important New York State movement, aimed to provide a manner in which approximately 300,000 qualified voters of an unusually intelligent type may cast their ballot at any general election is now before the people in the shape of a proposed state constitutional amendment to be voted on in November.

This measure, known as the Absentee Voting Bill, specifies that a general law be enacted to enable voters who may, "on the occurrence of any general election, be unavoidably absent from the State or county of their residence because of their duties, occupation or business require them to be elsewhere within the United States, may vote, and for the return and canvass of their votes in the election district in which they may respectively reside."

The successful ratification of this measure by the public will make it possible for such individuals as traveling salesmen, actors, business executives, instructors and travelers generally to have a voice in the administration of their respective communities, as well as furnish a means whereby such voters will have a say in the affairs of the nation.

Let it be fully understood that there is nothing of a partisan nature in the absentee measure. It is known as Amendment No. 2, and merits the support of the great conservative element which can see the unfairness and injustice of depriving voters, thoroughly qualified to select able statesmen, of an inherent right for representation in a matter of such vital importance to the country today.

The National Council of Traveling Salesmen's Associations is conducting a vigorous campaign for the passage of the amendment in New York State.

Every State in the Union should amend its Constitution in the same way that New York State intends to. Intelligent men, as the majority of traveling men undoubtedly are, should not be disfranchised because of the nature of their daily work.

Motor Transport Training Schools

The United States Army is definitely launched in the field of vocational training for the motor transport corps. It has no option in the matter, for men skilled in automotive vehicle operation and repair do not exist in anything like adequate numbers for the requirements even of civil life; and the war with Germany has demonstrated that no matter how good our army may be in other respects, its efficiency will be conditioned by that of the motor transport branch.

Army Schools Under Trained Teachers.

Therefore, the army is organizing schools to train men in the various branches of automobile repairs, construction, and operation. They are real schools under trained teachers where the time of the pupil is wholly devoted to receiving instruction.

Apart from the military necessity the automotive industries will benefit by the establishment of this training system.

The United States Civil Service Commission is receiving applications to fill 150 positions of assistant instructor in motor transport training schools. The entrance salaries range from $1,800 to $2,400 a year. Detailed information may be obtained from the U. S. Civil Service Commission, Washington, D. C., or from the secretary of the U. S. Civil Service Board at the post office or custom house in any city.

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Known bondholders, mortgagees, and other security holders, holding 1 per cent. or more of total amount of bonds, mortgages, or other securities: None.

WARE BROS. COMPANY.
(Signed) A. M. WARE.
Treasurer.

Sworn to and subscribed before me this 22d day of September, 1919. My commission expires January 21, 1923.
HARRY BLASE.
Notary Public.

Chile as an Automobile Market

American automobiles have become remarkably popular in Chile during the last five years. This has not been wholly due to the elimination of European sources of supply in the war period. It has been largely the result of a growing familiarity with the conveniences of motor driving, combined with the discovery that these advantages are possible for people of moderate means through the comparatively low prices of certain American cars.

Moreover, the high-grade American makes have been demonstrated with success to the class of Chileans that can afford expensive machines. In the social life of the cities the motor car has become an essential, replacing the family coach or carriage.

Outside the cities the lack of good roads in Chile seriously affects the use of automobiles. Two mountain chains extend the 2,500 miles of the country's entire length, and in the mountainous regions road construction is a problem. Between the mountain ridges are level areas, but even here the scarcity of good roads prevents much touring.

In the dry regions of the north some of the roads from the mining centers to the principal towns are only faintly defined mule paths. In the central part of Chile—a rich agricultural section that contains the mass of the Chilean population—the heavy rains and numerous streams are a constant menace to road improvements. In the sparsely populated districts of the south, few highways are yet available.

Motor Vehicles from United States

In view of the lack of improved roads in Chile, the large increase in the use of motor cars is the more significant. The following record of the exports of motor vehicles and parts from the United States to Chile shows that this trade multiplied 43 times from 1913 to 1918. The statistics given below are for the fiscal years ending June 30:

Year	Commercial Cars		Passenger Cars		Parts, Value	Tires, Value	Motor Cycles		Total Value
	Number	Value	Number	Value			Number	Value	
1913.....	.....	.....	78	$109,982	$4,711	$2,844	39	$8,134	$125,671
1914.....	2	$10,743	195	160,194	22,405	10,636	37	7,967	211,945
1915.....	.....	.....	120	64,327	14,721	21,353	2	570	100,971
1916.....	17	46,566	826	530,211	72,939	58,809	14	2,406	710,931
1917.....	69	160,696	2,587	1,821,842	248,043	264,603	34	6,389	2,501,573
1918.....	220	282,638	3,399	3,576,511	806,015	725,876	88	18,041	5,409,081
1919.....	152	223,733	1,057	1,606,258	775,556	1,139,873	56	13,825	3,750,745

War restrictions on the manufacture and shipment of automobiles reduced the exports of cars from the United States to Chile in 1919 to one-third the number and less than one-half the value of the cars shipped in 1918. The largest item in this trade in 1919 was passenger cars, and the second automobile tires. The second item was the only one that did not fall off in the 1919 period; on the contrary, imports of tires increased about 50 per cent. The roads of Chile are especially severe on tires, and this explains why shipments of tires to that country show such a tremendous increase in the period from 1913 to 1919. Exports of motor trucks, the number of which had increased over 300 per cent. in 1918, dropped about 30 per cent. in 1919, but indicated a rapidly growing tendency toward the adoption of motor freight transportation. While imports of motorcycles and automobile parts in 1919 showed slight declines from the 1918 figures, they were much larger than in any other previous year.

Pre-War Imports of Motor Vehicles

Shipments of automobiles from the United States to Chile have represented practically all of Chile's trade in this line since 1916, but the United States' share of this business in 1913, the last pre-war year, was but little more than 8 per cent. Germany had 22 per cent. of the trade, France 23 per cent., Great Britain 13 per cent., Italy 9 per cent., Belgium 4 per cent., and about 16 per cent. came through Argentina. The total value of Chile's imports of motor trucks in that year was only $12,332; passenger cars were worth $498,214, and the total motor imports, including parts and tires, reached but $644,877.

Four years later Chile's motor vehicle imports had multiplied nearly seven times, showing a total value of $4,211,634 in the 1917 calendar year. In that year the share of the United States in this trade was 95 per cent. France and Great Britain have continued to send tires to Chile, the value of the French tire exports having been about 50 per cent. more in 1917 than in 1913, while Great Britain's tire shipments have remained practically unchanged.

Principal Ports of Entry

About four-fifths of the automobiles imported into Chile go through the port of Valparaiso, from which point they are distributed throughout the central agricultural section of the country, the largest share going to Santiago, the capital. In 1917 the passenger cars imported at Valparaiso were valued at $2,629,662 and the motor trucks at $49,979.

A recent consular estimate places the number of cars in Valparaiso City at 4,000, of which many are doubtless the European models purchased before the war. No census of automobiles in other Chilean centers is available, but United States records show that the United States has shipped 8,262 passenger cars and 460 motor trucks to Chile in the last seven years.

Plans for Road Construction

Chilean authorities, both local and national, are beginning to realize that good roads are needed for the development of the mining and agricultural industries. The President of Chile in his message to Congress in June, 1919, strongly urged reform measures in the construction and upkeep of roads. For several years the Chilean Congress has had under consideration a new road law, to replace the law now in force which was passed in 1842 and which is generally considered inadequate for the present needs of the country. The proposed law will provide for funds to construct roads connecting the capitals of provinces, the larger towns and mining centers with ports, railway stations and navigable rivers. Mountain passes will also be improved under this law.

Road-making material is generally at hand, and with ample funds Chile will doubtless have a good road system. In the central section of the country a number of roads have been laid out, with pleasant borders of trees. In the northern nitrate regions, attention has been directed to conquering the deep sand.

Iquique, the chief port in the shipment of nitrate, offers an especially good market for motor trucks if these prove to be adapted to the hauling of supplies through the nitrate desert. Iquique, with a population of 40,000, is in shape a triangle, the sea in front and sand hills from 2,000 to 3,000 feet high at the back. Beyond these hills the desert, or pampa, runs for 150 miles, to the border of Bolivia. In some parts of the pampa the ground is about 25 per cent. salt

Carts and Mules in Nitrate District

Except for the nitrate railway, the only transportation is by means of carts and mule teams, and often extra teams must be added to haul a cart of supplies through the soft sand. Experiments are being made with motor trucks on these sand roads, and if the success of trucks is thoroughly demonstrated, they will undoubtedly replace the slow and expensive teams and carts. Plans are now under way for building an automobile road from Iquique to a point 6 miles south, and also for paving the Iquique streets

Antofagasta, the second nitrate outlet, is the largest port in northern Chile, and the chief shipping point of the copper companies. The city has a population of 50,000, and as a large percentage of the inhabitants is prosperous, the community is already one of the best automobile markets in the country. Even the taxicabs are the large, expensive models. The city streets have been paved recently, some with block stone, some with tar or asphalt composition, and there is a good road running out from the city about 5 miles along the beach. The old-time heavy carts can not be used on the new city streets, for a recent law requires that freight vehicles be equipped with springs.

The first motor truck was introduced in 1916, and an autobus line was also started in that year. Lately automobile garbage trucks have been installed in the city. Motor trucks will probably be used eventually by all the mining companies in the vicinity of

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Antofagasta, for transporting supplies to camps.

South of Antofagasta, where the mining interests begin to give way to the agricultural, plans are being put into execution for an automobile road from the port of Coquimbo to La Serena, the capital of the province. The road will be about eight miles in length and thirty feet in width and will provide an attractive and much-needed highway between these two cities.

Valparaiso and Santiago

While a large part of the automobile imports into Valparaiso are distributed to Santiago and other cities in the central section of Chile, a considerable share of the cars is retained in the port, where the population of 200,000 assures a valuable market for motor vehicles. The port is in the form of an amphitheatre, with high cliffs at the back, and the city is built on two levels, the lower city on the bay being connected by means of lifts with the city on the cliffs.

Plans are under way for extensive improvements in the streets of Valparaiso, and also in some of the roads running out from the city, including a road five miles long, on the high land bordering the upper city. The installation of motor busses in Valparaiso is contemplated, as the electric-car service is insufficient for the needs of the city.

Automobilists are trying to raise funds for a new and shorter route from Valparaiso to Santiago. At present some sections of the road are so bad as to be frequently impassable.

In the city of Santiago there are some fine, wide avenues, but many of the streets are narrow, necessitating short turns in restricted spaces, and this may have influenced the selection of the smaller and lower-priced cars that are used almost wholly as taxicabs. About a fourth of the cars used in Santiago are taxis, and the fares, which are charged in accordance with a fixed schedule, are relatively low, to compete in some measures with the low street-car fares.

There has been some interest in the introduction of omnibuses, though early experiments in this line were not successful. Wooden blocks were used in the first paving in Santiago, but these did not prove satisfactory, and stone blocks or asphalt have been used since. North of Santiago there are several stone quarries where stone and blocks are obtained for roads and city pavements.

Road Funds for Central Chile

The Chilean Government recently appropriated 29,000 pesos for the upkeep of roads in Santiago Province, 21,600 for Valparaiso Province, 129,700 for Colchagua, 97,500 for Linares, 70,300 for Curico, 59,700 for Nuble, 15,000 for Bio-Bio, and 150,200 pesos for the southern province of Llanquihue, besides smaller sums for various other sections.

A group of landowners in the province of Llanquihue has asked Government aid in constructing a highway from the city of Osorno to the lake of Puychue, which lies between Llanquihue and Valdivia provinces. The proposed road, 27 miles long, would furnish much-needed means of access to a rich agricultural and pastoral region, and would also connect with Argentina, through Lake Puyehue and communicating waters. Roads in the Andean region are not passable for automobile travel, even in the summer months, though a few ambitious automobile salesmen have crossed the pass at Uspallata, after great difficulty.

Automobiles in the Punta Arenas District

In Punta Arenas, the southernmost city in the world, there is a good demand for both pleasure and commercial cars. Of the 30,000 inhabitants in the Territory of Magallanes, 21,500 are in the city of Punta Arenas. The motor needs of this great sheep and cattle-raising section of Chile are suggested by the estimate of 1,400 vehicles in use in Punta Arenas in 1918. Every large ranchman is a prospective buyer for a truck that will meet his requirements in transporting wool from his sheep ranches to the coast, sometimes a haul of 300 miles. Approximately a quarter of the freight traffic with the ranches and the interior towns is done with motor trucks, the remainder being accomplished by oxcarts. Providing feed and water for the oxen is often a difficult and expensive problem, and as an estimated saving of 40 per cent. is effected in the use of motor trucks, it is apparently only a question of time when trucks will be used wholly for this service.

The comparatively short driving season in Magallanes makes timeliness important in shipments to this district. Cars to be exhibited for orders during the season should arrive not later than August, for if not on hand until the actual opening of the summer season there will not be time to send orders and receive cars for use during any considerable part of the driving period, which ends in March. Cars for Punta Arenas should be shipped direct, to take advantage of free admission into that port, and also because freight rates from Valparaiso and Buenos Aires are very high. When knockdown boxing is used in shipments there is a large saving in freight.

Kind of Cars Demanded in Chile

The most popular cars for use in the cities of Chile are limousines, landaulets and similar models, with decorative finish and luxurious upholstery. Black or dark-blue cars should not be shipped except on special order. Not many small cars are used, and the few to be seen usually have a small seat behind for the liveried chauffeur, for though the owner of the car drives he is required by custom to have a chauffeur in case of need.

The two-passenger car is, therefore, not popular, as it seats only one person besides the chauffeur. "Smart" cars of various sizes are liked, and cars of noticeable elegance are preferred by all that can afford them. The taxicabs, of which a large number are in use, represent the less expensive makes, and are usually purchased by individuals or companies on the installment plan.

The underslung type of car is not practicable for use on the rough Chilean roads; cars should have a clearance above 10 inches, and the tread must be at least 60 inches. For farm freight 2-ton trucks are used chiefly, while lighter trucks are used for town or city delivery. In the southern territory trucks should be adapted for hauling wool and logs. In the central section grain and other farm products must be transported. In the northern districts ore and supplies for mining camps will fill the trucks.

Few Electric Automobiles in Chile

There appears to be a prejudice against the use of electric cars in Chile, but a market for them could doubtless be developed by an active campaign of demonstration. In the large cities, particularly in Santiago, where there is little grade and the streets are well paved, there appears to be a good field for electrics. Moreover, the temperature in that region is moderate, not falling below 26 degrees Fahrenheit. Facilities for charging batteries could be easily arranged, and, as even gasoline cars are little used in the country, electrics should be able to compete successfully for city use. The two points which appeal most strongly to buyers of electrics in the United States, namely, cleanliness and ease of operation, do not have the same weight in Chile, for driving by women is practically unknown.

One objection to the electric car is its price, for a large gasoline machine can be purchased for the price of an electric, and large cars are desired because of their more imposing appearance and greater seating capacity. As the price of current is high, the operating cost of an electric would probably be about the same as that of a gasoline car. Agents introducing electric vehicles should arrange for current and for expert assistants to keep batteries in good condition.

Tariffs—Touring Conditions

The type of finish of automobiles plays no part in the tariff rates in Chile, for weight alone is considered in the fixing of duties. This makes the tariff highest on the largest cars, with the exception of motor trucks, which are dutiable at only a third of the rate on passenger cars. The Chilean customs duty on motor trucks is $3.31 per 100 pounds gross weight; on passenger cars the duty is $9.93 per 100 pounds gross, while on motorcycles the rate is $24.83 per 100 pounds net weight. Automobile parts and tires are included in the rate on passenger cars. In the Territory of Magallanes, however, all motor vehicles and parts are exempt from duty.

A tourist bringing an automobile to Chile should make out an application at the custom-house in the port of entry, binding himself to pay the usual duties in case he does not re-export the car within six months. Upon re-exportation of the machine within this period his obligation will be canceled. All automobiles must be registered and licenses secured from municipal authorities. A license from any municipality is sufficient for travel in any part of the country unless a prolonged stay is made in a different municipality. Licenses from the country of origin are not recognized in Chile.

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Trade Methods and Conditions

Experienced salesmen find that demonstration of cars is the best method of advertising. Moreover, public proofs of the advantages of using motor cars and trucks in place of carriages and carts must be thorough and continuous. Newspaper advertising is found valuable to supplement the agent's demonstrations, and circulars from the home office are an important aid. Short and varied circulars at frequent intervals prove more effective than fewer and longer communications.

The American branch banks established at Santiago and Valparaiso render an important service in furnishing credit information on prospective customers and agents, as well as in offering facilities for handling the financial end of shipments.

The recent lowering in Chilean exchange accompanied a general depression in Chile caused by the slump in the nitrate market after the close of the war and the consequent termination of the abnormal demand for nitrate. For a long time thoughtful Chileans have realized that the country should not depend wholly on nitrate for its prosperity, and as a result of increased interest in other directions the exports of the agricultural, pastoral and manufacturing industries increased more than 100 per cent. from 1912 to 1917. The growth in these lines has meant a greater diffusion of the purchasing power of the country and is now helping to normalize conditions.

Figures show that Chile's favorable trade balance of $25,000,000 in 1913 is multiplied five times in the succeeding 3-year period, indicating a prosperity warranting an even greater increase in the automobile trade than that shown in the figures given in the beginning of this article.

Decline of the Horse in New York City

As a source of power on the farm and to some extent for travel by farmers, the preservation of the horse on farms without much if any diminution of number seems probable from what has occurred and not occurred to the present time in the use of automobiles, auto-trucks, and tractors by farmers. But it is asserted that in the city the horse will soon become as extinct as the dodo. The advance of the process of extermination, if that is the right word, has been investigated in the city of New York by the Field Agent for that State of the Bureau of Crop Estimates, United States Department of Agriculture.

The census enumerators of 1910 found 128,224 horses in that city, including nearly 3,000 horses on farms. By the stable enumeration of the Sanitary Bureau of the Board of Health, 108,036 horses were found in 1917 and 75,740 horses in 1919. Assuming that the enumerations of the two agencies are fairly comparable, it appears that 16 per cent. of the number of horses of 1910 had been lost by 1917, and 41 per cent. by 1919. Over 25 per cent., or one-quarter, were lost in the last two years and only 16 per cent. in the preceding seven years. These are averages for Greater New York, and the progress of the movement has varied in the several boroughs of the city.

In the older and more congested business boroughs, Manhattan and Kings (old New York and Brooklyn), about 38 per cent. of the horses have been displaced, while in Queens and Richmond (Staten Island) boroughs the displacement is 60 and 54 per cent., respectively, and in those two boroughs the movement was more intensive from 1910 to 1917 and less intensive in the last two years than in old New York and Brooklyn. To the present time the horse has survived in crowded streets and in dense business sections in greater degree than elsewhere. Of the total horses of the entire city, 60 per cent. are in Manhattan and Bronx boroughs and 31 per cent in Kings borough, or 92 per cent. in the three boroughs, and nearly as large a fraction if the Bronx is excluded

Factories Spring Up in New Countries

One of the most disquieting effects of the high prices of American manufactured goods and the difficulty experienced by oversea merchants in obtaining deliveries is the stimulus given to the industrial development of countries which, but for the war, would have found it quite impossible to compete with the highly organized industries of the United States and Europe.

High prices, high freight rates, and lack of transport are likely to prove more potent aids to the establishment of manufacturing enterprises in the newer countries than a protective tariff with duties of 100 per cent. on imported goods. The difficulties of obtaining machinery and skilled labor, although great, are not insuperable.

In the opinion of the National Foreign Trade Council, a continuance of the present state of affairs will inevitably lead to the growth of manufacturing in many countries which have hitherto afforded large markets for our products, and this may involve serious changes in our export trade.

In this connection, it is interesting to note that during the war many industries quite new to India arose to fill the void left by the stoppage of exports from Great Britain, and that many types of machinery and mechanical fittings are now being successfully manufactured there. The Bengalee is a capable artisan when properly trained, and it is hardly necessary to add that his labor is not of the highly-paid variety. The development of a prosperous iron and steel industry in the Transvaal, South Africa—where coal and iron ore in inexhaustible quantities exist in close proximity—is already becoming practicable. In Australia, too, the manufacture of woolen goods is attracting increasing attention.

While such industrial development is bound to come to all countries possessed of the necessary raw materials, it is unfortunate that these markets should in any way be closed to American products at a time when a wide demand for manufactured goods is needed to insure full employment to American industry.

It would seem the part of wisdom to prevent further developments of this kind, whenever possible, by setting aside a definite percentage of factory output to supply to those countries in which manufacturing is not highly developed, the goods which they cannot do without.

The Remedy for High Living Costs

The United States Council of National Defense, composed of the Secretaries of War, Navy, Interior, Agriculture, Commerce, and Labor, has made a careful investigation of the high-cost-of-living problem, and finds

That the nation's productive powers have not been fully utilized since the armistice.

That too few goods, notably the necessities of life, have been produced, and that even some of these goods have been withheld from the market, and therefore from the people.

That the high cost of living is due in part to unavoidable war-waste and increase of money and credit.

That there has been and is considerable profiteering, intentional and unintentional.

The Council believes that the remedies for the situation are:

To produce more goods, and to produce them in proportion to the needs of the people.

To stamp out profiteering and stop unnecessary hoarding.

To enforce vigorously present laws and promptly to enact such further laws as are necessary to prevent and punish profiteering and needless hoarding.

To bring about better co-operation and method in distributing and marketing goods.

To keep both producer and consumer fully informed as to what goods are needed and as to what supplies are available, so that production may anticipate the country's demands.

Goods and not money are the means of life. Better standards of living are impossible without producing more goods. Man cannot consume what has not been produced.

At the war's end our allies had desperate need of the essentials of life. We have had to share our resources with them, but this drain will gradually lessen. In so far as our shortage of goods is due to this cause we can well afford to be patient.

It is just as essential that we have patience with the economic situation here at home. The process of production requires time. If production is rapidly increased, vastly improved conditions will prevail in America when the results of present and future labor begin to appear.

Team work is imperative. It is just as essential between retailer, wholesaler, and producer, as it is between employer and employe. One group of producers cannot wait on another group. The manufacturer, the farmer, the distributor must each immediately assume his part of the burden and enter upon his task. The nation cannot afford curtailment of goods vital to the people.

(Continued on page 54)

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

X.—BALL AND ROLLER BEARINGS, THEIR CARE AND ADJUSTMENT

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

Anti-friction bearings may be divided into two general classes—ball bearings, and roller bearings. Each of these two classes may be still further divided; namely, ball bearings into cup-and-cone bearings and annular ball bearings, and roller into straight roller, and taper roller.

In Fig. 1 are shown examples of each of the above types. There always has been, and doubtless always will be discussion concerning the relative merits of the various types of bearings. It is not intended to enter that discussion here. Suffice it to say that any of them are entirely satisfactory if *chosen* of proper size for the work they are to handle, *properly installed*, and given *reasonable care*. The choice of size is not in the hands of the repairmen—but the *installation* and *care* are. And here are some points that the repairman should observe in caring for and installing anti-friction bearings.

Points Common to All Bearings

It is on the repairman's shelves that the first step in bearing abuse often occurs—due to careless storage. Bearings should be wrapped in oiled tissue paper, packed with a light, pure grease, and kept away from moisture. For rust is one of the greatest enemies to bearings, as even a light coating will break down the highly polished surfaces, and cause rapid disintegration under service. The first point is to *keep all bearings in storage well greased and wrapped, and away from rust-producing moisture.*

Next, water from high pressure mains should never be used for car washing purposes. In the first place it will destroy the finish of the car body, but more important here is the fact that water from high-pressure mains will be forced into the anti-friction bearings, and remaining there, allow rust to set in, and shorten the life of the bearing.

In the lubrication of anti-friction bearings, nothing but the purest mineral oils or greases should be used. A light oil may be used where the bearing is enclosed, and working at high speeds under light loads. In other installations vaseline, or a good grade of light grease is more satisfactory. But in any case a lubricant that is rancid or oxidizes should not be used.

Bearing Removal

Another point in which repairmen are often careless is in bearing removal. Wherever possible, the races of sticking anti-friction bearings should be removed by means of a puller, as shown in Fig. 2. And it is to be noted that the force from the puller is transmitted to the bearing *at the sticking race*. Even if driving or prying is necessary to remove a bearing, the force should never be applied to the free race, and thence through the balls or rollers to the sticking race. And then a wooden or brass implement should be used, in conjunction with a mallet or babbit hammer, so that the blow is cushioned, and is heavy, rather than sharp.

Then again, many repairmen are careless in cleaning bearings prior to examination and reassembly. Dirty kerosene or gasoline is used to wash the bearings, with the result that dirt in grit is washed *into* the bearing. This is usually worse than not attempting to clean the bearing at all, for there was only a possibility of dirt in the first place, and a certainty after the bearing was so washed.

A convenient method of cleaning bearings is to dip them in a pail of boiling water, in which a cup full of common washing soda has been dissolved. This cuts away all of the grease and oil, and washes out any grit that may be present. Immediately after so dipping, the bearing should be rinsed in clean kerosene, to remove the cleaning solution, inspected, and if O. K., packed in light grease, and reinstalled. The above described method of removing grease and oil from parts is well worth applying to all parts cleaning work.

Bearing Replacement

The statements covering care necessary in bearing removal, in general, apply to bearing replacement. Ordinarily, bearings are a push fit on the outer race, and a light drive fit on the inner race. And the pressure necessary to replace the bearing should be applied to the sticking race.

In Fig. 3 is shown one method of installing a bearing. It will be noted that a tube just large enough to go over the shaft, and press against the inner race is employed. This applies the pressure at the required point, and distributes it over the race so that there is no tendency for it to wedge. In doing this a lead or heavy hammer should be used.

It is not always possible to have a piece of pipe of the right size, and a special bearing replacement tool that is more general in its uses is illustrated in Fig. 3. This is brass, and may

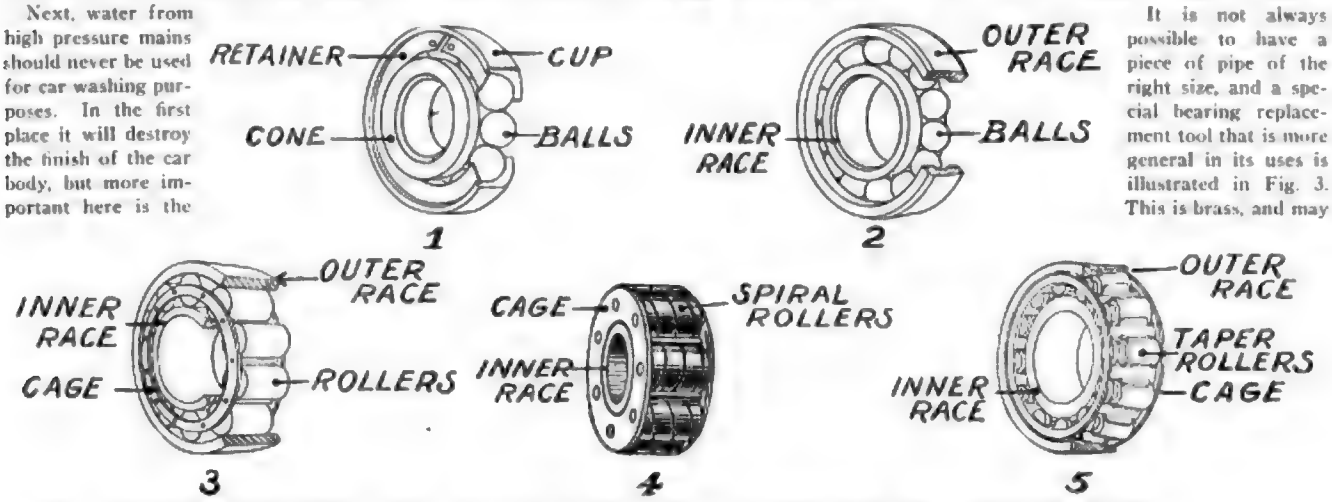


Fig. 1. Common types of anti friction bearings. (1) The cup and-cone bearing. (2) Annular ball bearing. (3) Plain roller bearing. (4) Hyatt roller bearing. (5) Timken tapered roller bearing.

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be made of a size to meet the requirements of most motor car bearings.

Another point to be watched in bearing replacement is the condition of the bearing housing and shaft. If the housing is worn so that the bearing is a sliding fit in it, with some play, a new housing should be secured, or possibly the housing bushed. But shims should never be used. As stated, the inner race should usually be a light press fit onto the shaft, and if the fit is too tight, the bearing may be expanded, distorted, and caused to bind. In this case the shaft should be dressed down until it is a light press fit into the bearing.

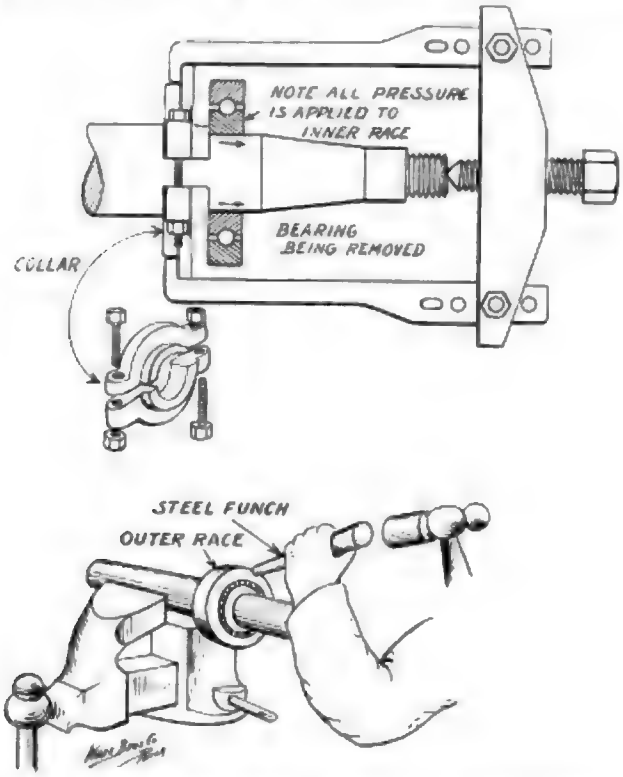


Fig. 2. Above—Proper method of removing an anti-friction bearing. Below—How not to treat a bearing.

Adjustment of Cup-and-Cone Bearings

Of the ball bearings, the cup-and-cone is the only type that may be adjusted, and this is effected by bringing the cup and cone closer together. Care must be taken not to get the bearings too tight, and create too much end pressure on the balls, and again the bearings must not be so loose that pounding is possible.

The following is the proper method of adjustment of bearings of this type: First, pack the bearing with grease, and screw the inner cone onto the shaft, and quite tightly up against the balls. The pressure should be such that the bearing binds slightly, and the shaft should be rotated to see that it does not stick at any point. Then the inner cone may be backed off until the shaft turns freely, but not enough to allow any perceptible endplay. All locking devices should then be secured without disturbing the adjustment.

Replacement of Annular Ball Bearings

Little can be added to what has already been said about annular ball bearings. It is to be noted that this type of bearing cannot be adjusted, and if worn, should be replaced. This replacement is not such an expensive proposition as might be imagined, as a bearing of this type, if not abused, can readily be rebuilt by the makers, and oversized balls reinstalled.

Hyatt Roller Bearings

Details of the Hyatt roller bearings are shown in Figs. 1 and 4. It will be noted that the distinctive feature of this bearing is the coiled rollers, the flexibility of which is claimed to soften shock loads, and distribute pressures evenly to the races.

This type of bearing is non-adjustable, and in cases where wear has occurred, replacement is less frequently necessitated by the operation of the bearing itself than by the operation of the parts depending upon the bearing.

Examination of this type of bearing on overhaul should show the surfaces of the rollers and races to be smooth and in good condition. Greatest attention should be paid to the roller cages. These should be rigid, and not *racked*. If racked, replacement should be made.

On reinstallation, care must be taken not to squeeze the cage in the mounting, as shown in Fig. 4. In this type of bearing, it is necessary that the cage containing the rollers rotate freely, and this is not possible when the cage is squeezed. A constant clearance of at least $\frac{1}{32}$ inch is necessary between the cage and the mounting.

Another point to be noted is to see that the dowel or set screw holding the outer race in position does not project through the outer race, and interfere with the rollers. When this occurs, the rollers will lock, and cannot operate.

Timken Roller Bearings

The Timken bearing is of the taper roller type, as shown in Figs. 1 and 5. It is readily adjustable, and the method of adjustment is the same as that given for the cup-and-cone bearing.

The additional points to be noted in the case of this type bearing are indicated on Fig. 5, which shows a typical installation in

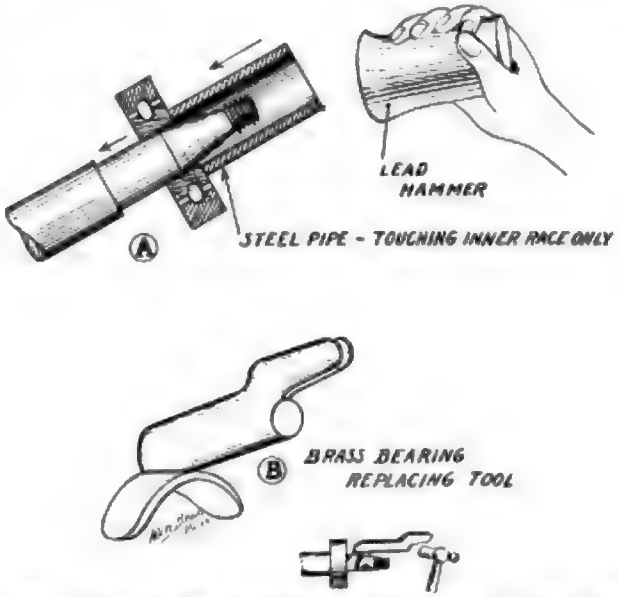


Fig. 3. If possible, bearings should be pressed in place in an arbor press, with pressure applied only to the inner race. Otherwise a piece of tubing, block of wood, or special brass tool should be used—and the replacing force applied only to the inner race.

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a motor car front wheel. The first is that the enclosure, or dust ring, is backed solidly on the spindle, as shown at (1), Fig. 5 Similar care likewise must be taken in the installation of the cups in the wheel hubs. These must be firmly seated, and the seating checked up by measuring the distance (D) all the way around from the cup face to the hub lip, and making sure that the distances are equal. The same applies in general to the seating of the cone at (3). The space (4) should be packed with a non-acetic grease, and the lock nut (6) securely fastened after the adjusting cone (5) has been located as previously described.

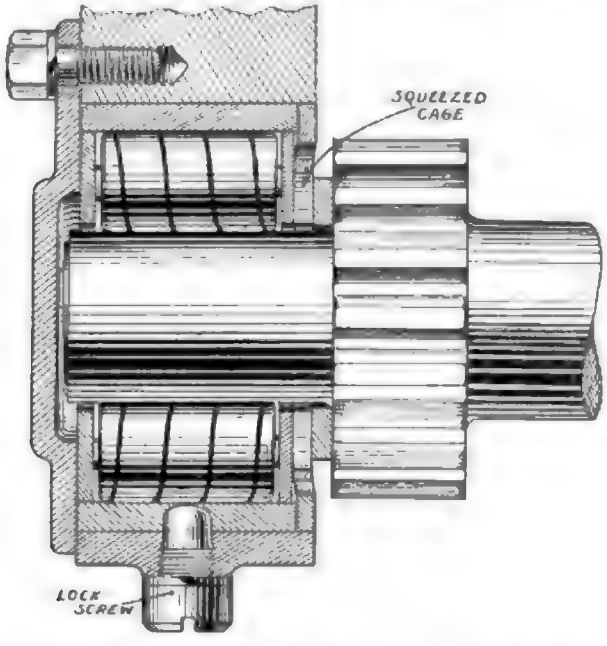


FIG. 4. On Hyatt bearings, grooving or scoring on either cage and indicates "squeezed" cages. There should be at least 1/32 inch clearance between the cage and the container. Note that it is possible to screw the lock screw in so far that it interferes with the rollers. This must be avoided.

To assure the best service, these bearings, and in general all anti-friction bearings, should be examined once every 5000 miles, cleaned, lubricated and adjusted if adjustment is possible.

These are the main points that the repairman should know about anti-friction bearings, and by observing them, greater service will be obtained from his customer's cars, to their greater satisfaction and his profit.

Imported Rubbing Brick Again

Imported handy size rubbing brick, the same as before the war, is now coming in limited quantities. R. E. Rodriguez, 56 Warren Street, New York, received a considerable part of the first shipment received from Europe since the war began, in both the 3-I and 3-II grades.

The Field Mfg. Co., Owosso, Mich., announced that the new additions to their plant are virtually completed. The new structure provides about 75,000 square feet of floor space for the production of automobile bodies.

Trend of British Engine Design

From the London "Times"

Sufficient information is now available to give a fairly clear indication of the trend of motor-car engine design for the current year. Never before has such a variety of choice been available to the intending purchaser. The range of types comprises radial air-cooled single-crank engines, overhead valve gear, vertical, water-cooled engines, sleeve-valve, and "Vee" type engines.

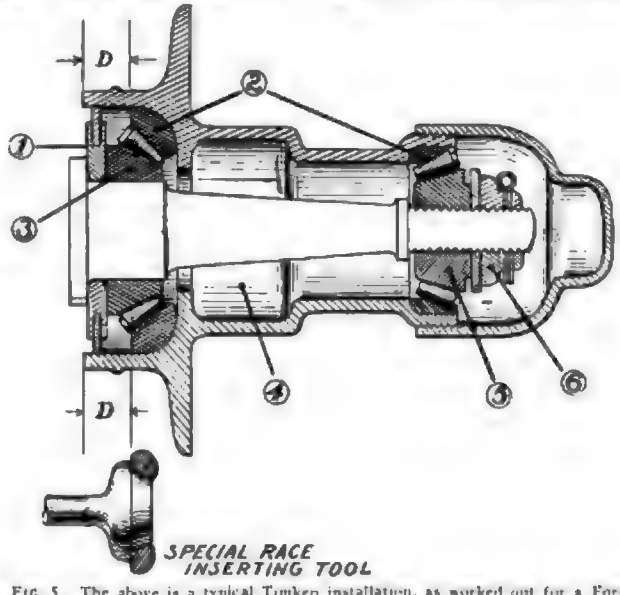


FIG. 5. The above is a typical Timken installation, as worked out for a Ford front wheel. The points to be noted are marked and are common to most bearings of this type

Air-Cooled Engines

The influence of the war, particularly in aero engine developments, has played a considerable part in these new designs, and a very strong bid will be made by the air-cooled radial engine as a power unit for the light, cheap car to meet American competition.

In aviation from the beginning, because of the saving in weight, the air-cooled engine has held considerable sway. It was, in fact, in large measure due to the introduction of the rotary air-cooled Gnome engine, that the first great impulse was given to flying, and throughout the war the air-cooled engine, of both the radial and the rotary types, continued to develop for aviation purposes. The only advantages of the rotary over the radial engine are the better cooling of the cylinders owing to their rotation, and the flywheel effect of the rotating mass of the cylinders; against these must be set the waste of power in rotation, the centrifugal stresses imposed upon the cylinders by rotation, and the higher consumption of fuel and lubricating oil.

For high-speed and short-distance flying, the air-cooled rotary engine is not yet displaced by the radial form. The rotary engine does not lend itself to motor-car propulsion, because of the disadvantages mentioned above, and on account of the fact that it cannot be silenced, the exhaust taking place direct to the atmosphere from the exhaust ports in the cylinder head.

The primary requirement of aero engines for all purposes, and especially for war purposes, is reduction to the minimum of weight of engine per unit of power developed, and in this connection it must be remembered that an aero engine is required to develop a high percentage of its full power during a relatively large fraction of its total running hours. Aero engines, furthermore, in general, are of large power per cylinder compared even with the maximum output required of motor-car engines. These factors

conduce to make the conditions generally much more severe in the case of aero engines than those which motor-car engines are called upon to satisfy.

Reduction of Weight-Power Ratio

The power units of motor cars for 1919 are chiefly notable for the means adopted for securing increased efficiency as measured by greater output per unit of cylinder volume and lighter weight of engine per unit of power developed. The pleasure of motoring may be said to be measured largely by the powers of acceleration of the car and the qualities of easy riding over all types of surfaces. The powers of acceleration are dependent upon carburation and a low ratio of car weight to power output, while easy riding depends upon springing and upon the total running weight, a certain minimum weight being desirable to ensure that the vehicle will "hold the road."

There is, undoubtedly, a strong demand for a cheap car with a reasonable capacity for speed and passenger carrying, and the problem of designing such a car resolves itself largely into the question of total weight per horsepower developed and total weight per passenger carried. As a result of experience gained during the war it is natural that a solution by means of the air-cooled internal combustion engine should be seriously considered. Air cooling dispenses with the radiator, water pump, water piping, water in system, &c., and requires merely a larger fan than is normally fitted to insure that under all conditions an ample supply of air is passed over the engine cylinders to carry away the heat. The engine, for instance, must be efficiently cooled when it is developing full power in climbing a hill at relatively slow speed with a following wind.

Advantages of Air-Cooled Type

With air-cooling a radial disposition of the cylinders around the crankshaft ensures an equal distribution of the cooling air and gives an exceedingly light engine, since the crankshaft has but a single crank for the three or five cylinders. The crankshaft is the heaviest unit of the normal motor car engine. The radial cylinders may be turned out of steel forgings, or they may be cast in aluminium and possibly copper coated to increase the heat conductivity.

There are several light cars in process of being put on the market with radial air-cooled four-cycle engines of three cylinders disposed at 120 deg. round the single crankshaft. The advantages claimed are lightness, cheapness, high power of engine per total weight of car, and accessibility. In regard to the last, it should be stated that arrangements are made so that the whole engine can readily be rotated to bring to the top the particular cylinder requiring attention. The lifting-off of a cylinder can be very quickly accomplished, and decarbonizing is more readily carried out with such an engine than with the majority of water-cooled engines, even when their cylinders have separate heads. Complete decarbonizing with a radial engine can be carried out with one cylinder at a time, access to the piston rings being obtained by lifting off one light cylinder. Such engines being short, the designer has a greater free length of chassis in which to provide the required accommodation, and the absence of a radiator in front of the car makes access to the engine from the front easy and convenient. These cars will have a normal design of bonnet, and their appearance will conform to present ideas of symmetry.

The one question that practice alone can finally settle is whether air-cooling will suffice under all conditions of running, and whether a reasonable degree of flexibility will be attained. When installed in aeroplanes, the engine is always in a current of air, having a speed approximately proportional to the power being developed by the engine, whereas, as already pointed out, with a motor car this is not so, so that the means for insuring this current of air must be highly efficient.

Lubrication

With the earlier aero air-cooled engines a copious supply of lubricant was necessary, more particularly to serve the piston and the cylinders, and the partial combustion of this oil somewhat relieved the temperature of these parts, although the consumption of oil was in consequence excessive. With later engines this difficulty has been largely remedied. It might well be supposed that the lubricating oil would tend to run into the cylinders at the bottom of the crank-case and there be consumed. However, it has been found in practice that with forced lubrication on the "dry" crank case system, i. e., with two pumps and a good design of scraper rings fitted to the pistons, this fear is not realized.

Since reliance is placed upon a current of air for abstracting the heat from the engine, ample provision must be made to carry away this heated air, and since the engine will run at a relatively high temperature, the passenger accommodation, to insure comfort, should be suitably insulated from the hot engine and the hot air passing from underneath the bonnet of the car.

With earlier air cooled engines difficulties were experienced through cylinder distortion, the leading side of the cylinder being better cooled than the following side. With increased experience and careful design, the inlet and exhaust valves being suitably disposed to counteract any tendency to unequal cooling, this disadvantage has been overcome.

The High-Efficiency Engine

Another solution of the problem of designing a cheap, light car lies in the use of the small light engine of high efficiency. Saving in weight in this case is achieved by securing a high output from an engine of small volumetric capacity, by taking advantage of aero engine experience in regard to valve and valve-gear design, carburation, and so forth. Such engines will have large valve areas with quick lifts. Overhead valve gear is becoming more generally adopted. With the larger, high-powered and more expensive cars, the new models show generally simple refinements on pre-war designs as a result of aero engine practice, although in certain cases the pre-war design is being changed to a high efficiency engine based entirely on aero engine practice.

Power Plant of the Light, Cheap Car May Be Air-Cooled

So far as the light, cheap car is concerned, the adoption either of the high efficiency engine or of the air-cooled radial engine would seem to be preferable to any mere copying of American practice, since they are more fitted to British engineering methods, precedent and tradition. Provided that, so soon as the designs are proved in practice, production is inaugurated on the basis of specialization, so far as possible, of each firm on one component and on combinations of the firms concerned with the one final product, the immense output of motor cars which is being planned at the present time in the United Kingdom should have a most favorable chance of being absorbed by the home, colonial and foreign markets.

Malleable Capacity Idle

In connection with the insistent demand for malleable castings, the American Malleable Castings Association reports that this condition has been anticipated and that ample facilities have been provided for both the present and future expansion of the industry.

It is stated, however, that at the present time the shortage of unskilled labor will not permit this great capacity being used. Fully 200,000 tons of malleable capacity is today idle but would be immediately available if the necessary labor could be secured.

Improvement in this direction is not looked forward to with any great hope until the activities of other industries are curtailed or until there is a flow of immigration sufficient to build up the supply of labor available for foundry work.

This means, therefore, a large percentage of capacity idle continuously in every plant regardless of heavy unfilled orders.

New Malleable Plant in Louisville

Efforts extending over a year for establishment in Louisville, Ky., of a malleable iron foundry—the basis of a number of other industries located in that city—resulted on August 20th in a transaction whereby a $500,000 plant will be erected immediately by the Illinois Malleable Iron Company, Chicago, capitalized at $2,500,000.

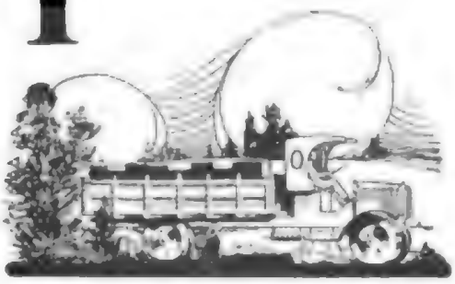
Operations will be started by December 1, according to announcement, and 500 operatives will be employed. The concern will have an output estimated at between 6,000 and 10,000 tons of malleable iron a year. It is announced that erection of the plant will be started immediately.

Louisville uses 7,500 tons of malleable iron each year. The product is used by all concerns manufacturing articles into which iron centers. It is purchased largely by railroads automobile manufacturers, agricultural implement factories and wagon plants.

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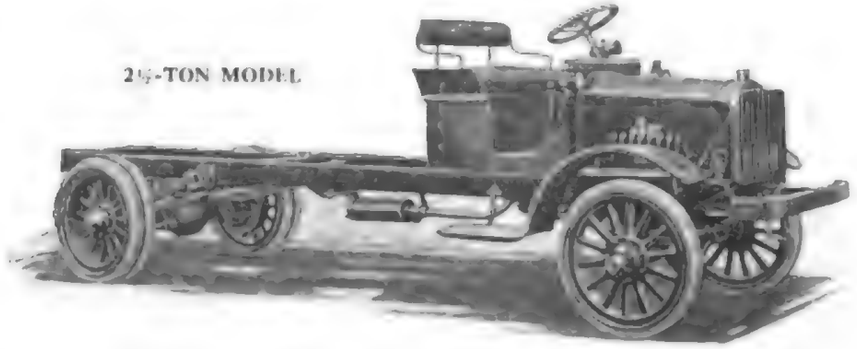
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Very recently five Rowe trucks were started on their way to Copenhagen, Denmark



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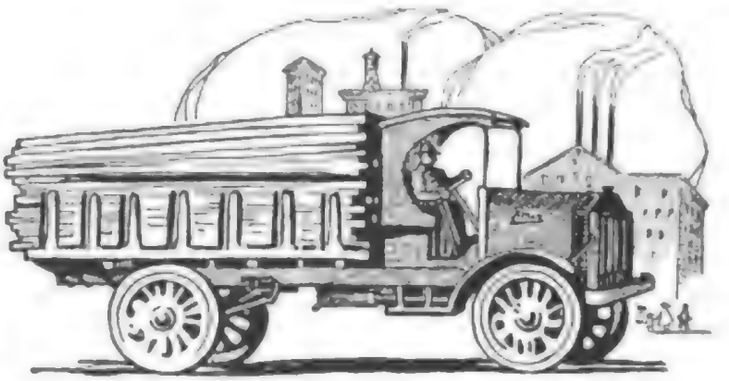
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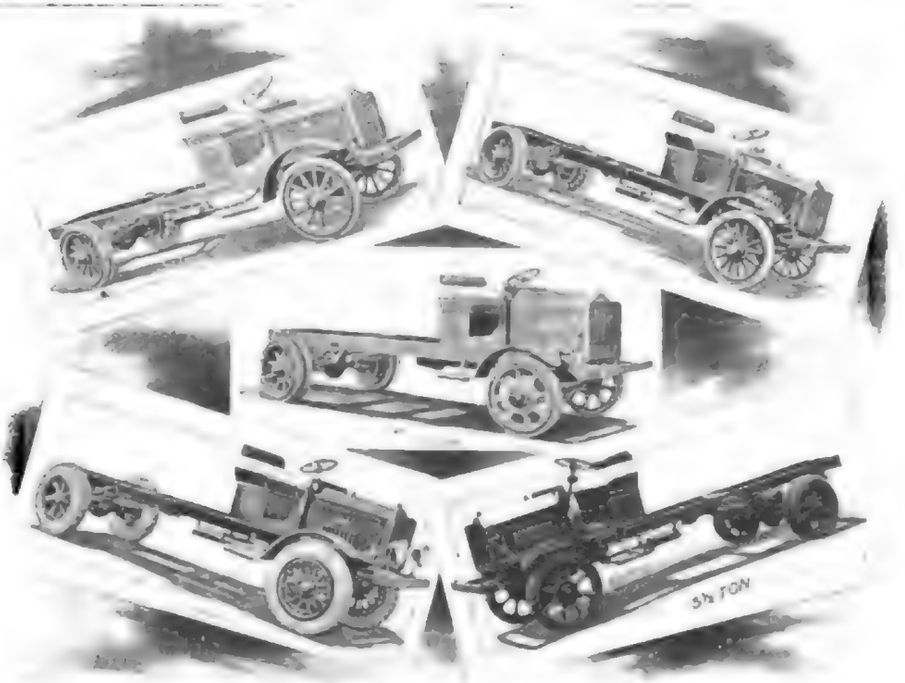


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ENGINE:—On Pneumatic 3-Ton Model, 50 H. P. Herschell Spillman. On other models, 4-Cylinder Wisconsin.

AXLES:—Sheldon. Rear axle of housing type with David Brown worm gear. Worm special steel, heat treated, with hardened differential gears. Roller and ball bearings used throughout.

SPRINGS:—Sheldon. Rear, semi-elliptic type, so slung as to minimize all road shocks.

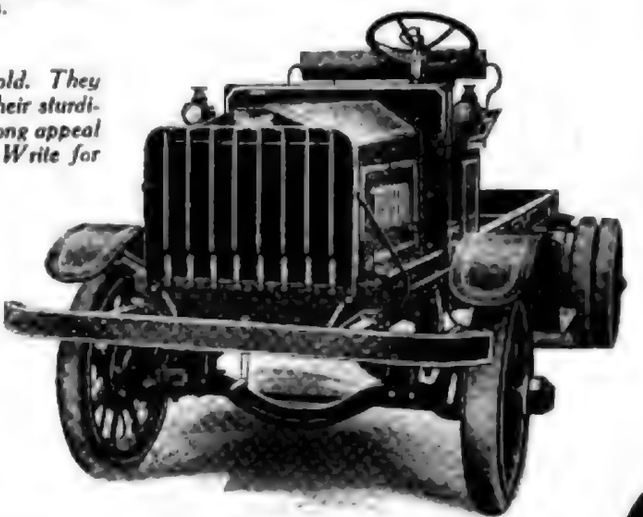
STEERING GEAR:—Ross. Irreversible, of the worm and nut type.

TRANSMISSION: — Brown-Lipe. Four speeds forward and one reverse. Gears special triple heat treated.

IGNITION:—Bosch high tension magneto.

CARBURETOR:—Zenith.

Rowe Trucks make good wherever sold. They go over hills with power to spare. Their sturdiness, simplicity, accessibility make a strong appeal to all prospective truck purchasers. Write for our liberal terms to dealers.



ROWE MOTOR CO.

LANCASTER

PA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

"Vehicle Monthly" Time Savers

"The Vehicle Monthly" will appreciate the receipt of any "Time Saver" made by its readers.
A rough sketch and a short description are all that is necessary.

(This series of "Time Savers" was begun in February, 1919. Back numbers may be had from the publishers)

"Vehicle Monthly" Time Saver No. 46
PLACING SCREWS IN INACCESSIBLE PLACES

Frequently in assembling the smaller accessories of a motor car, such as the magneto, generator, oil pump, or water-pump, it is necessary to replace a screw or bolt in an inaccessible place. In the case of machine screws, the difficulty may often be overcome by inserting the screw through a strip of stiff cardboard, and using it as a holder until the screw is started. When the threads are started, the cardboard may be torn away, and the screw driven home. Oftentimes a cap-screw may be similarly replaced by slotting the head for a screwdriver with a hacksaw.

"Vehicle Monthly" Time Saver No. 47
AIR HOSE RE-WINDER

The motor car driving public is usually not too considerate about the use of the air hose; and frequently leave it spread out over the floor after use. As a result, it may be run over and crushed by other cars, and lying in grease or oil still further reduces its useful life. A means sometimes employed to prevent this is to provide a hose re-winding device that will automatically pull the hose up out of the way after use. Such a device comprises an idler pulley secured to the hose, and attached to a counterweight through a curtain cord and fixed pulley at the ceiling. The counterweight may be a small pail containing just enough scrap iron to counterbalance the hose.

"Vehicle Monthly" Time Saver No. 48
WRIST PIN REMOVER

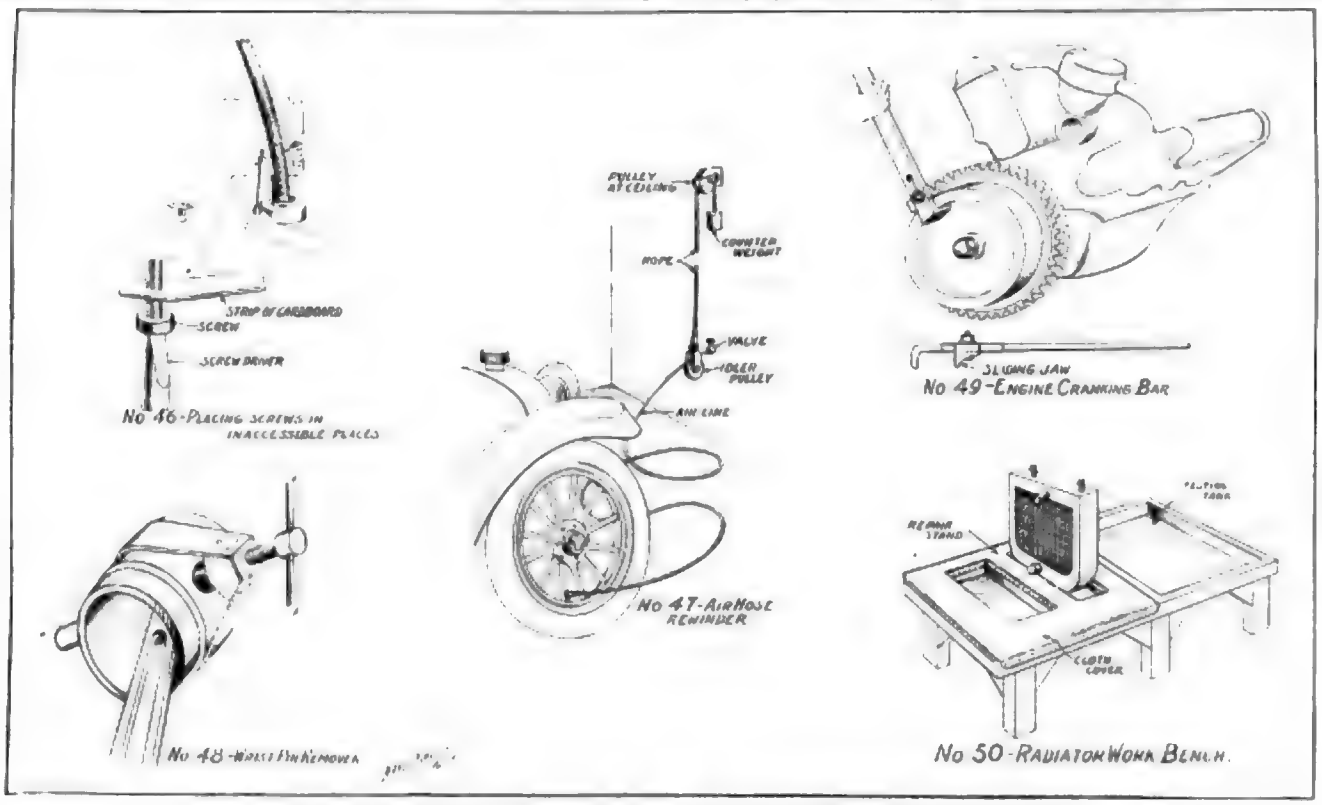
Particularly in the case of alloy pistons, care must be taken in the removal of piston pins not to injure the piston. Where an arbor press is available, the removal may be accomplished through its use in conjunction with a V-block. But for this work an exceptionally handy tool is illustrated. This remover is simply a strip of strap iron, formed to go around the piston, and having its ends attached to a tapped angle block through which a threaded rod is passed. A hole is drilled through the strap opposite the block, to permit the wrist pin to pass through, and by placing the device on a piston in the manner shown, the pin may readily be forced from place

"Vehicle Monthly" Time Saver No. 49
ENGINE CRANKING BAR

After a complete engine overhaul, retiming is necessary, and as the engine is usually very stiff, turning the flywheel to the various positions necessary is not an easy matter. A special engine cranking bar is useful in this work, and by having one that is adjustable, various types of engines may be handled. This cranking bar is steel, about 2 in. by ½ in., and 3 ft. long, bent up at right angles at one end, and having an adjustable or sliding jaw bolted to it in a slot. By catching the flywheel flange between the jaws of the bar, the flywheel may be readily turned to any desired position for timing.

"Vehicle Monthly" Time Saver No. 50
RADIATOR WORK BENCH

A compact bench arrangement for radiator repair is illustrated. The bench is in two



"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ON THIS PAGE.

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parts—one, a shallow tank filled with water, in which the radiator is immersed, air pressure applied, and the leaks located; the other a low bench on which the radiator may be placed in any desired position, and the repair accomplished. Outside of the consolidated arrangement, which promotes efficiency by eliminating motions, the feature is the rectangular openings through the bench top. These openings are such that the radiator may be inserted edgewise, and held securely in the position most advantageous for repair work. And the top is covered with cloth or old carpet, so that the finish of the radiator is not damaged.

Money Savers for the Body Shop

In these days of high manufacturing costs every automobile body manufacturer, as well as manufacturers of trucks, buggies and wagons, naturally is in a receptive attitude toward the introduction of new machinery designed to save time and thus lessen the present excessive costs of doing business.

A line of machines designed expressly to save money in the wood departments of vehicle factories is the specialty of J. O. Wallace & Co., Chicago. This concern is concentrating its facilities on a series of portable wood-working machinery which is attracting attention and selling itself to an increasing number of good body shops.

Three of these machines of special interest to the automobile body and carriage manufacturer are illustrated on this page.

Fig. 1 represents the Wallace bench saw. This machine makes possible the application of an idea which is sure to increase the output and greatly reduce the cost of body building, and in fact any woodwork, for it is possible to do the work at the bench, thus saving a great amount of time which must now be wasted running to and from stationary machines and at the same time doing this work on a machine.

As the name implies, the Wallace Bench Saw is a bench tool, portable and designed to operate on the electric lighting circuit, yet it has ample power to take a full two-inch cut through the hardest of wood, making it possible to use this machine for 80 per cent., if not all, of the work generally done by hand or on the big circular saw in the average woodworking plant.

A one-half horsepower General Electric motor supplies ample power, due to the care with which this saw was designed. The motor is fitted with a ball bearing which operates as a thrust bearing when tilted for angle cutting.

Fig. 2 shows the Wallace 14-inch bench band saw, which can handle a very large percentage of the band saw work of the vehicle factory. It is just the size to supplement the big band saws, and in many shops handles all the work.

In many shops the big band saw is so very busy that several men are always waiting their turn to use it. More saws are needed—but not of the large type. There is no advantage in going to the expense of buying additional big machines and of paying for twice the power actually required to do the work.

Smaller type band saws can and should be used to supplement the present big machines. These smaller saws can be distributed about the shop so that they will be convenient to every operator, thus saving the time now wasted by men walking back and forth between the benches and the stationary machines. This method will eliminate all useless waiting at the large saw. Moreover it will save 50 per cent. in power consumption.

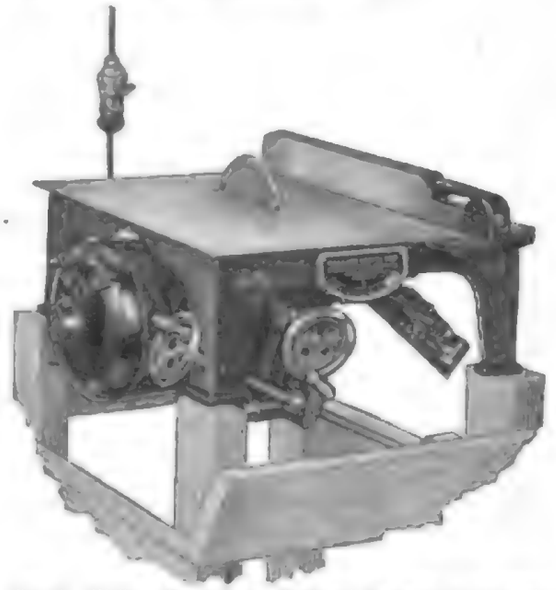


Fig. 1. Wallace Bench Saw. Designed to operate on electric light circuit.

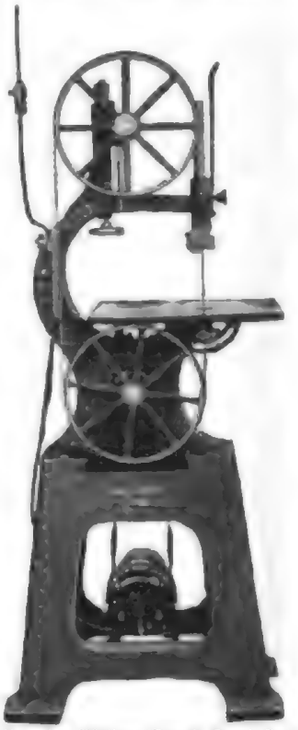


Fig. 2. Wallace Bench Band Saw. Just the handy size.

The Wallace bench jointer (Fig. 3) is noteworthy because of its exceptional power. Yet despite its power it can be carried by one man wherever there is work to be done; and as it is equipped with its own motor, lamp cord and plug all ready for operating at any time from an ordinary lighting circuit, it represents a definite advance in woodworking machinery

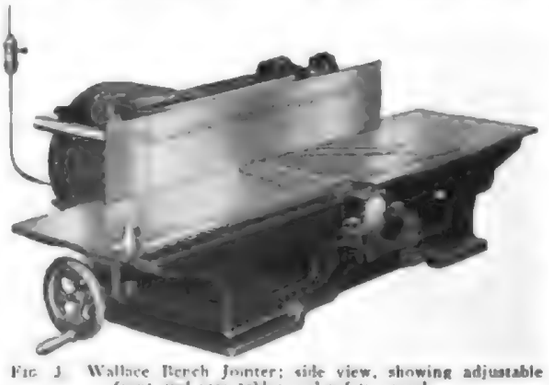


Fig. 3. Wallace Bench Jointer; side view, showing adjustable front and rear tables and safety guards.

An especially interesting feature is a new fence that has been developed in connection with this new machine. This fence is mounted on the motor and slides backward or forward on rods rendering it more quickly and accurately adjustable than any ordinary machine. The fence is also designed so that only a fraction of an inch is lost on the table when the fence is set for beveling.

In examining this new machine one's attention is instantly arrested by the novel manner in which the motor is applied. The cutter head can be easily taken out and other heads inserted in only a few seconds. Tables are arranged to slide backward to permit the use of these special heads or forward so as to work with the narrowest possible throat opening, a feature that will prove especially desirable when the machine is doing small or very close work.

Ball bearings are used on all motor and cutter head bearings, thus eliminating friction and prolonging the life of the machine.

An extremely ingenious and apparently very efficient arrangement of the flap and shutter guard has been effected by mount-

(Continued on page 50)

BODY DEPARTMENT

Printing

EXPERIENCE, skill, equipment, all contribute to the excellency of our product. We are constantly adding to our facilities, and are now better prepared than ever before to satisfy critical customers. Our art and engraving departments enable us to add a distinctive touch to much of our work. We will be glad to quote prices for any Commercial Printing.

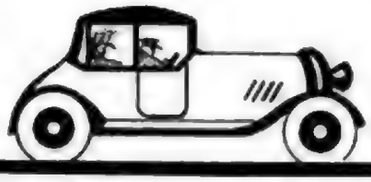


WARE BROS. COMPANY

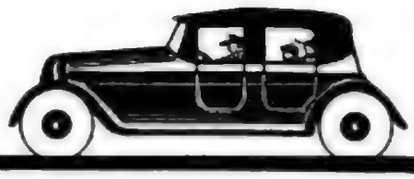
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Closed Body HARDWARE



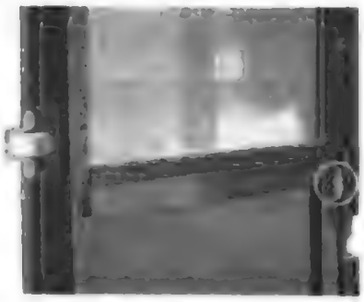
Ternstedt Anti-Rattlers Make Closed Car Windows Tight



Showing Eureka Anti-Rattler and its application



Part No. 500



Showing Excelsior Anti-Rattler and its application



Part No. 600



Showing Universal Anti-Rattler and its application



Part No. 700

COMBATING rattle has been the big job of the body builder since the inception of the closed car industry. Tight doors and tight windows are absolutely essential.

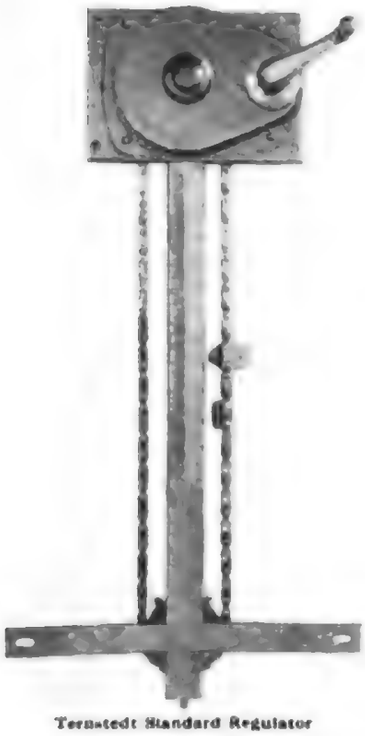
Ternstedt Anti-Rattlers make windows perfectly tight. Simply constructed, easily installed, they require no adjusting and last indefinitely. Like Ternstedt Window Regulators and other Ternstedt Hardware, they are made with exacting precision in order that they may give the utmost in satisfactory service.

If you want closed body hardware that will perform and endure in accordance with your expectations, Ternstedt should be your choice.

Ternstedt Regulators are being used in practically all high grade closed bodies now manufactured. Ternstedt Regulators are simple in construction and positive in operation.

We manufacture Curtain Rollers, Windshield Wipers and other closed body hardware.

We invite the trade to send for blue-prints and samples



Ternstedt Standard Regulator



Ternstedt Off-Set Regulator

TERNSTEDT MANUFACTURING COMPANY

ARTILLERY AND MUSTER AVENUE :: :: DETROIT, U. S. A.

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Motor Bodies and Parts

A New, Perfected Demountable Top

The three illustrations shown on this page appear to be enclosed cars, built from the sills to the roof as a unit. But in this case appearances are rather deceiving. In point of fact, it is not only in the picture that the cars look like out-and-out regular closed work. The cars themselves, on a dealer's floor, have the same regular closed car appearance. The ordinary man, and the dealer himself, would have to be told that the tops are entirely separable from the touring car bodies on which they are mounted.

These tops were invented and patented by the Sargent & Ham Company, 28-32 Scotia Street, Boston, Mass., and are probably the finest demountable tops made in this or any other country.

The interior of the Sargent & Ham demountable top is upholstered in wooden cloth which covers the leather and cushions of the open car in slip-cover fashion so as to give the exact appearance of enclosed car upholstering.

The body is not a one-half door proposition, but has full limousine doors, so that when the owner puts on his enclosed top his touring car doors are removed and the top, with high doors, is put on the top of the touring car body.

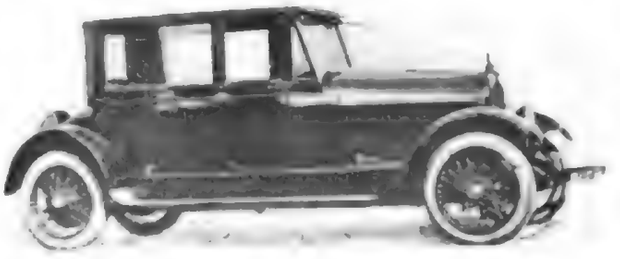
As a closed car there is absolutely nothing to show that a "two-piece" body is being used, because everything inside is so nicely concealed underneath the cloth upholstery.

The Sargent & Ham Company claim to be the largest builders of this class of tops in New England, and have excellent facilities for producing them in even larger quantities than at present.

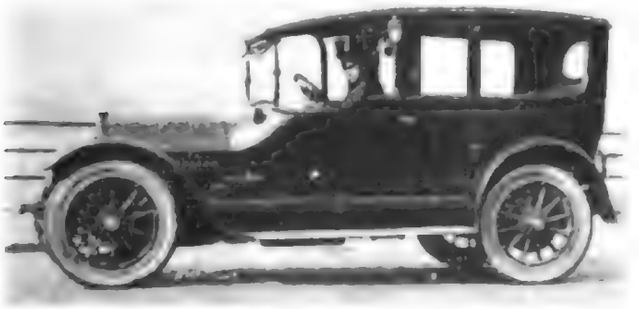
The company has decided to let the entire trade in on this perfected demountable top, and makes it available to car owners throughout the United States. To this end they offer shop rights and licenses to local body builders for the production and installation of this patented construction.

Body builders everywhere will find, after a few examples of the Sargent & Ham tops have been exhibited and sold in their respective cities, that their shops will become demountable top headquarters for their territory.

There is nothing like this top on the market, except those that have already been made under the Sargent & Ham patent, but when customers have once been shown how they can convert their touring cars into real, luxurious and handsomely appointed sedans or limousines, and thereby save hundreds of dollars, they will thank as well as pay liberally the body builder who introduces such a top to their notice.



Demountable Sedan Top on Marmon Roadster



Custom Built Demountable Cab Side Limousine Top on Cadillac Touring Car



Custom Built Demountable Town Car Top on Jordan Touring Car.

NEW DEMOUNTABLE TOPS MADE UNDER SARGENT & HAM COMPANY'S PATENTS.

The Mercer Motors Co., Trenton, N. J., has been organized to take over the plant and business of the Mercer Automobile Co., manufacturer of pleasure automobiles, with works on Whitehead Road, Trenton, N. J. The present plant has a total floor area of about 137,000 square feet, and the new company plans to enlarge the works to provide an aggregate capacity of about 250 automobiles per month. The extensions, with machinery installations, are estimated to cost $650,000.

Case Hardened Lumber

Many of the warped and twisted wood parts received for examination by the Forest Products Laboratory at Madison, Wis., are found to be made from case hardened lumber.

A wooden part manufactured from case hardened lumber is well on its way to the scrap pile. At the time of manufacture the part appears perfect but later on it shows up twisted and distorted. Case hardened lumber is full of stresses which have set up by faulty drying, and the balance of these stresses is easily destroyed by any one of several common manufacturing operations.

A case hardened board when resawed, for instance, has such a strong tendency to curl up that mere nails and screws will not hold it flat. If case hardened stock is run through the planing machine and a slightly heavier cut is made from one surface than from the other, warping results.

Saddle chair seats made from case hardened lumber warp because the material was scooped out only from one side. Pulley stock may be so severely case hardened that when a hole is drilled through it, a large crack or split will immediately occur, because the stress set up incident to case hardening is more powerful than the wood surrounding the hole. Patterns for castings, if made from case hardened lumber, are doubly sure to warp and "work" when shaped and subjected to varying moisture conditions.

In the manufacture of wood products, from telephone parts and other delicate and precise equipment to shipping boxes and crates, case hardened wood is responsible for a lot of trouble and excessive manufacturing costs.

Case hardening in lumber can be relieved

(Continued on page 35)

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Working Draft of Five-Passenger Sedan

This chassis has 120 inch wheel base; is 23 inches from floor to top of frame; 29 inches across front, and 33½ inches across rear part.

The length of frame from front of dash to rear centers of wheels is 89⅝ inches; diameter of tires 32 x 4 inches. The length of body from lower front corner of angular sedan front to rear end is 98 inches, and the entire length of body from front of dash to rear end at center is 107⅜ inches; divided as follows: From front of dash to front door joint 47 inches; width of door 25 inches, and from hinge door joint to rear end of body on top rail 35⅝ inches. Seat positions are as follows: From front of dash to front edge of seat, 28 inches; depth of front seat at bottom edge, 20 inches; space between seats, 29½ inches; depth of rear seat, 26 inches.

The measurements across the hood and body are as follows: Across front of hood, 24 inches; across dash, 36 inches; across body and lower angular front, 44¼ inches; across upper angular front on top rail, 48 inches; across angular front on standing pillar (top and bottom), 50 inches. Across front edge of standing pillar, 52 inches; across front door joint, 55½ inches; across rear door joint, 56 inches; across rear end corner pillar, 54 inches. Amount of turn under, 2 inches.

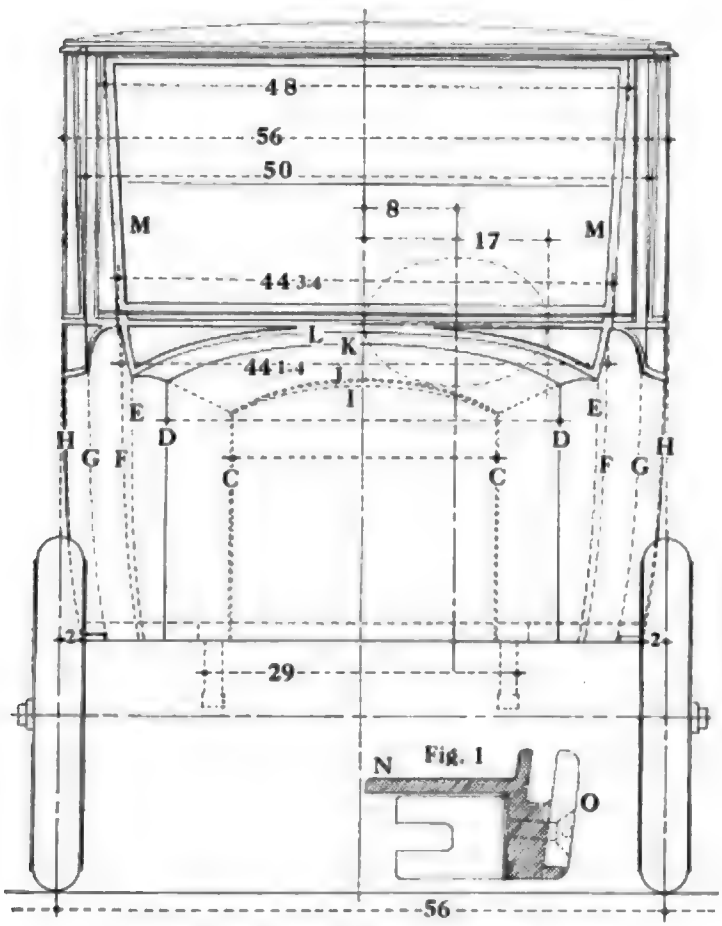
Extreme height of body at center, 57¼ inches; from lower edge of sill to upper edge of top rail, 55 inches, and from lower edge of sill to top of fence rail, 30 inches.

The hood has vertical side surfaces and is curved on top, forming a corner on A side elevation, and on cowl B, up to angular front; these curves are shown on front elevation, also the various turn unders. C. C. front elevation represent the front edge of hood; D D the dash width; E E front elevation, showing shape and amount of turn under, taking on vertical line E side elevation.

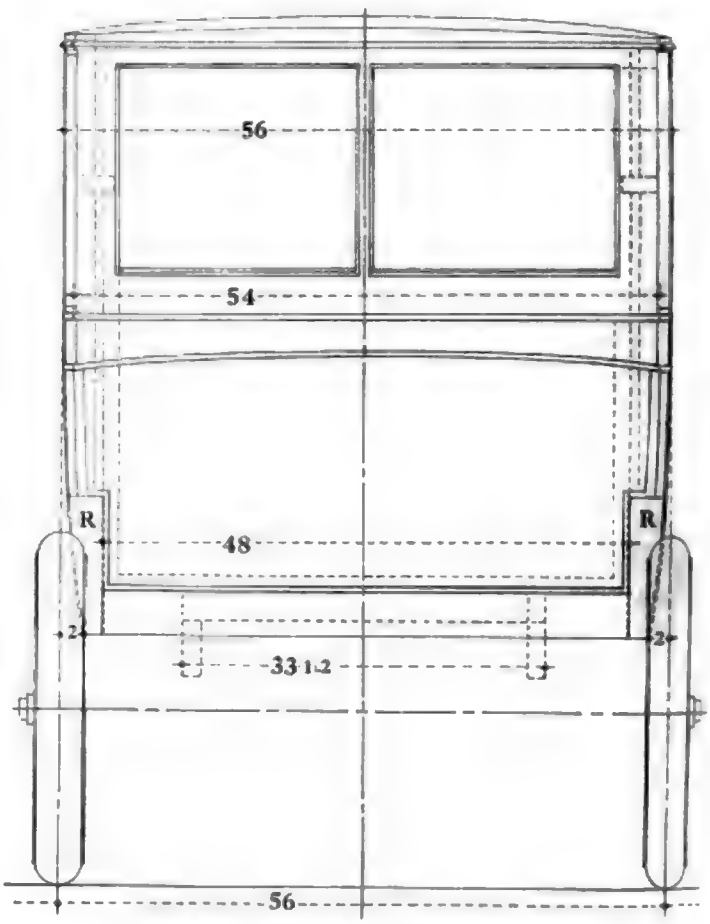
F F, front elevation, gives shape and amount of turn under, taken on vertical line G, side elevation. G G, front elevation, gives shape and amount of turn under, taken on vertical line G side elevation. H H front elevation represents the whole width of body, shape and amount of turn under.

The points on front elevation correspond with those of side elevation and half bottom view. Note the top curves on hood and cowl. I front elevation represents the two angular lines shown on bottom view I I. Curve J, front elevation, represents vertical line J bottom view. Curve K front elevation, represents vertical line K on bottom view. Curve L, front elevation represents vertical line L on bottom view. The angular lines M M front elevation, represent the two contracted lines M M bottom view. Compare the widths of the angular front on front elevation with the widths on bottom view. The glass is square up and down on standing pillar, and slanting on metal front M M front elevation.

The frame in which the windshield rests as well as the windshield frame is made of brass, which is shown on Fig. 1 full size, and is cast to shape. The end of Fig. 1, N is bent around the windshield, leaving a space of 1/32 inch "play." This is done to keep the water running down to the fence rail inside the body. The frame of Fig. 1 is shaded and the windshield frame is white, so is the key O. The windshield is fitted into the frame, secured with dowels made to turn, and the key screwed to the frame to fit the side glasses and hold them in position. The shaded portion of the frame is screwed to the body, top and bottom.



FRONT ELEVATION OF FIVE-PASSENGER SEDAN.
Note the layout of hood, cowl and windshield.

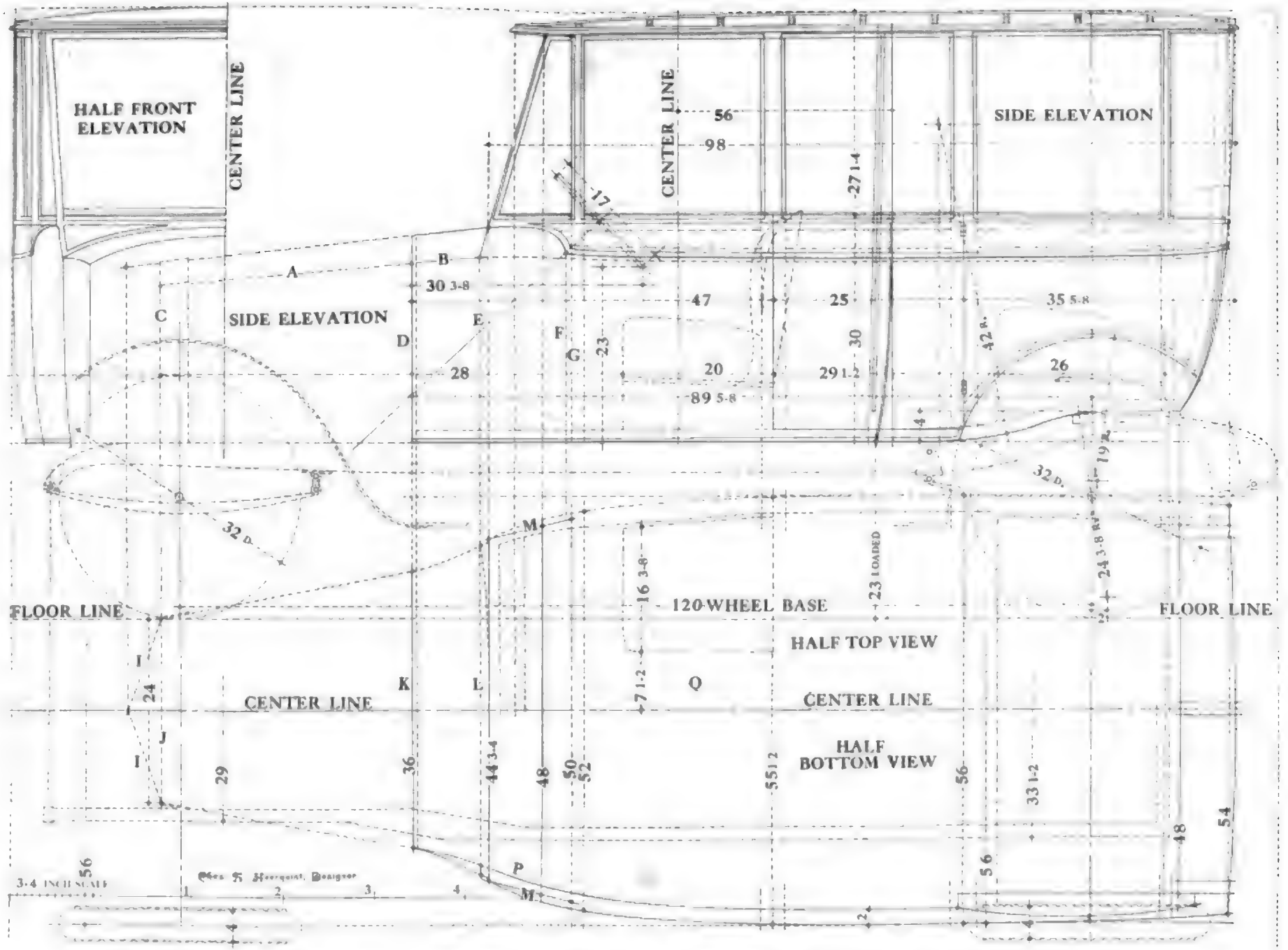


REAR ELEVATION OF FIVE-PASSENGER SEDAN.
Note layout of wheelhouse.

The Construction of the Body

This body has very little side curve and is only 2 inches narrower on rear end than

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WORKING DRAFT OF FIVE-PASSENGER SEDAN. FIGURES FOR HOOD AND COWL SHOWN ON FRONT ELEVATION. (See page 24.)

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across the doors. Across the front standing pillar the body is 50 inches wide, or 6 inches narrower than across the doors, making 3 inches each side. This width of 50 inches on angular front and cowl is narrowed down to 36 inches, making a perfect convex-concave curve. The bottom curve 1' half bottom view, is less pronounced and runs into the 36 inch wide dashboard as shown on bottom view. The top view shows the top rail and the seats in dotted lines.

The steering wheel is on the left side of the body and consequently cannot be shown on either top and bottom views; but it is shown on front elevation. The steering wheel on the right side is even with the center line as shown on front elevation, consequently the driver's seat must be wider and must at least be even with the center line. The space between the seats should be as shown on Q, top view, which is 7½ inches between the two seats. If the sills are to rest on the frame, which is 33½ inches wide from out to out, the sills must be 11 inches wide, because the body is 56 inches wide and has only 2 inch turn under each side.

The four standing pillars are removable and the fixtures are shown for top and bottom on this page. The upper back panel is recessed and moldings are shown around the back of body as illustrated on back elevation.

The rear wheels are recessed as shown on R R, back elevation, and the novelty is, that there are two large glasses made to drop, same as the side glasses.

Before automobiles came into use the horse-drawn broughams and coaches had only a small window, generally oval and stationary, but later the glasses were made to shift. In automobile practice these windows were made larger and all were made to drop; 20 x 30 inches was the largest made; but the larger the windows are the more difficult they are to lift when fitted with heavy plate glass; consequently two windows are more desirable, as shown on back elevation. Windows of this kind cannot be fitted with automatic lifters on account of the back being in the way.

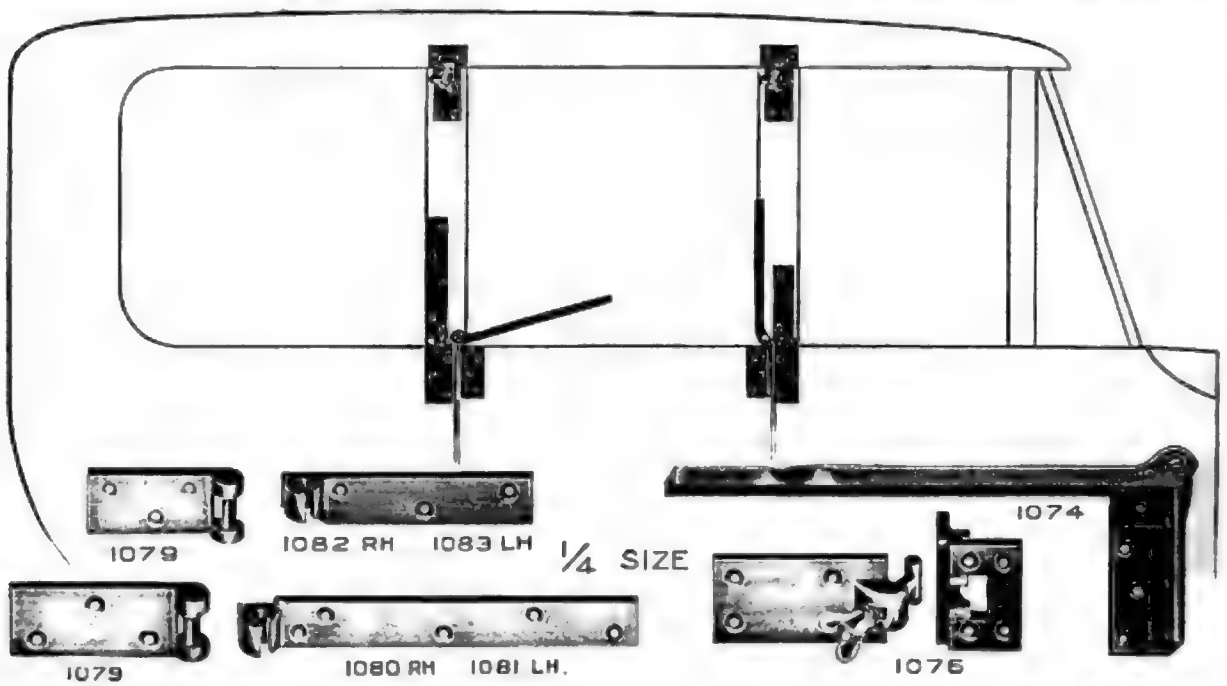
Those bodies are paneled with poplar panels except the cowl or, if Haskelite plywood is used, including the cowl, but in this case a form is necessary to secure the shape. The cheapest method is to use metal fitted by hand.

The four standing pillars above the fence rail are removable, for which the fixtures can be bought ready made, as shown in the illustration.

With this system, if the glass frames are up, they are lowered and the pillars are removed. If the glass frames are up, the doors cannot be opened, consequently it is better that door flappers be used, by which the glasses run up and down between the door flappers and consequently, using the flappers, the doors can be opened or closed from inside or outside. The doors and body are designed for mechanical lifts, and as there is only a 2-inch turn under, the pillars can be made very light, even lighter than shown on side elevation.

This body has no trimming above the fence rail except the silk curtains, and all the wood work, including the top and curves are filled in, stained and varnished; consequently built-up panels or Haskelite are used to cover it.

Relative to the angular front, of which a section is used in Fig. 1, they are also made of angle metal strips with a very light frame, in which the glass is fitted from the inside and screwed to the angular frame. The object is to have this front to appear very light and to keep the water from entering.



FIXTURES FOR REMOVABLE STANDING PILLARS, AS FURNISHED COMPLETE BY THE ENGLISH & MERSICK CO., NEW HAVEN, CONN.

An Opportunity to Get Good Wheels

Many manufacturers are having great difficulty in getting the wheels and wheel parts they want at the present time owing to the scarcity of labor and the difficulty in obtaining certain materials. Others have found that the wheels they use are not keeping pace with the improvements in the rest of their products.

The New Wapakoneta Wheel Company, Wapakoneta, Ohio, is in a position to give you immediate action on your wheel needs, whatever they may be. They can give you guaranteed quality, shipments in lots of any quantity when you want them, and can make you a price that will mean a real saving.

Uneven Coatings Cause Warping

Coatings of equal moisture resistance should be applied to all surfaces of a wood product which would give dissatisfaction if it were to warp in service. Tests at the Forest Products Laboratory have shown that even when wood is properly kiln dried no coating entirely prevents it from picking up or giving off moisture and, consequently, from swelling and shrinking under the influence of varying atmospheric conditions. Varnish, shellac and other moisture-resistant finishes merely decrease the rate at which the moisture changes in wood occur. The higher the grade and the more coats applied the slower will be the moisture changes.

Unequal coatings on opposite surfaces of a wooden article cause unequal rates of change in moisture content and hence unequal shrinkage on the two sides of the piece. The result is that the wood tends to cup or twist out of shape, making the coatings equal is the obvious remedy.

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Drying Lumber the Right Way

A few years ago a manufacturer of automobile bodies, or a builder of wagons or carriages, might have been content to know only that a certain quantity of lumber had been delivered to his plant and stored away in the lumber sheds. In those days he had his choice of the best grades of timber and at comparatively low prices. This stock usually had been air-dried for a long period.

Now, lumber is an exceedingly high-priced commodity, not nearly so well graded as formerly, and full of moisture. There is very little good air-dried stock. These conditions have made factory kiln-drying absolutely necessary. As the demand for kiln-drying facilities has increased so rapidly, many new ideas have been brought out. Refinements in details and designs of kilns have been numerous as engineers have endeavored to develop an ideal drying apparatus.

Some of these devices and methods have been worked out by a number of the most experienced and intelligent timber experts in this country, including government forest laboratory officials and manufacturers of wood products of long experience in the actual operation of wood-using plants.

The quintessence of their experiments and the most valuable of their discoveries in the art of wood drying have been made commercially available and their approved recommendations are incorporated in the timber drying kilns manufactured by the National Dry Kiln Co., Indianapolis, Ind.

The Humidifying Principle in Lumber Drying

It is conceded by various authorities on the subject of kiln drying that, granting the usual facilities to be ample, lumber is dried in direct proportion to the amount of moisture which the air surrounding it may contain. Air containing a small amount of moisture will absorb a great deal of moisture from the lumber, and inversely, air containing a great deal of moisture will not absorb very much.

Now if this were all that we had to consider, it would seem that the matter of kiln-drying lumber would be a very simple one, indeed. But, as is well known, we do not dare dry our lumber at great speed or without due regard for many physical properties relative to shrinkage, strains, etc.

It is necessary to follow certain rules regarding temperatures, degrees of relative humidity and volume of circulation. These rules, or drying charts, are now fairly well known and recognized.

As stated above, the most essential air condition to maintain is the pre-determined degree of relative humidity. By maintaining and controlling the proper schedule of relative humidity, we can maintain and control the very drying process itself.

The automatic humidity regulator is an epochal invention in the science of drying lumber. Here, at last, is a practical, substantial and accurate way in which to control humidity conditions in a dry-kiln.

This device is attached to the steam line supplying the humidifying apparatus. It will maintain constantly any degree of relative humidity for which it may be set. It will compensate for any variation in exterior or interior conditions. Too much or too little ventilation, hot or cold weather, dry or humid atmosphere, all are taken care of automatically, accurately and instantly.

The device is an adaptation of the well-known, self-contained thermostat, which has been used for many years. Two of these are placed in opposition on a balanced steam valve. One of the thermostats is responsive to dry-bulb temperature; the other is made responsive to wet-bulb temperature by means of a silk wick suspended in a constant level water supply. The apparatus is similar in this respect to the well-known hygrometer.

Pressures generated in the thermostats act upon the balanced steam valve, one tending to open it, and the other to close it. The proportionate temperatures or pressures thus control the amount or volume of steam flowing to the humidifying apparatus.

Adjustments for varying degrees of humidity are secured by adjustments of the weights shown on the lever attached to the steam valve.

The thermostatic elements used in the construction of this valve have been in practical use for some fifteen years, on automatic temperature control devices. This assembly or adaptation of these elements has been in use for about one year, in both an experimental and a practical way. A number of these installations have been in commercial use for some months. A great many more are now under construction.

There comes a time in the drying process when free moisture is suddenly exhausted. Without automatic control, it devolves upon the operator to note this time and to provide for it by readjusting his steam humidifiers to supply additional moisture to maintain the humidity at the predetermined point, according to his drying schedule.

Manifestly, it is impossible for the operator to have his attention upon each of his dry kilns every hour of the entire twenty-four. Consequently, it must often happen that these vital changes take place during the night or at other times when he is not present. A few hours may pass during which wrong humidity conditions may obtain within the kiln. The use of the automatic humidity controller will obviate any such happening, and will compensate for any changes that may occur which might affect humidity conditions.

National Dry Kilns in Motor Vehicle Industry

As to the application of National dry kilns in the vehicle trades, a visit to the plant of the Schwarz Wheel Co., Philadelphia, Pa., will furnish an example of the difficult work easily accomplished with this kiln. The Schwarz Wheel Co. probably furnish more automobile wheels to high-grade car manufacturers than any other concern in their line, and as they number the leading automobile makers among their customers, nothing short of perfect drying of stock will satisfy this concern. The Schwarz dry kilns were ordered for the express purpose of drying 4 by 5 inch green hickory billets for automobile wheels. Those familiar with the subject will realize what a problem the drying of green hickory of such size means. Yet the National dry kilns do this work with less than 1¼ per cent. of culls.

Other concerns whose names are familiar to our readers who are drying heavy green oak and hickory stock with equal satisfaction are the Turnbull Wagon Co., Defiance, Ohio; Imperial Wheel Co., Flint, Mich., and W. K. Prudden & Co., Lansing, Mich. A dry kiln that will dry green oak and hickory fresh from the saw and in large dimensions is certainly a successful dry kiln, as any lumber expert will testify. As a matter of fact the Nationals dry any sort of timber from the lightest of soft wood to the densest pieces of timber that ever enter into vehicle construction.

The C. R. Wilson Body Company, Detroit, Mich., spent a great deal of time and considerable money investigating the merits of the various dry kilns, and selected National kilns, believing them to be the very best thing obtainable for automobile body work yet in the market.

Other users of National dry kilns in the vehicle industry are Rex Buggy Co., Connersville, Ind.; Sheller Wood Rim Mfg. Co., Portland, Ind.; Briggs Mfg. Co., Detroit, Mich.; Racine Mfg. Co., Racine Wis., Columbia Wagon Co., Columbia, Pa.; Auburn Wagon Co., Martinsburg, Pa., and others equally prominent in the trade.

Some of the Latest National Installations

Among manufacturers who have very recently or are at present installing National dry kilns are Ford Motor Co., Detroit, Mich (2 orders); St. Louis Mfg. Corp. (General Motors), St. Louis, Mo.; Fisher Body Corporation, Detroit, Mich. (2 orders); Fisher Body Co. of Canada, Ltd., Walkerville, Ontario; Kelsey Wheel Co., Memphis, Tenn.; Northern Wheel Co., Alma, Mich.; Chevrolet Motor Co. of Canada, Ltd., Oshawa, Ontario; The Baker R. & L. Co., Cleveland, Ohio (2 orders); Maxwell Motor Co., Inc., Dayton, Ohio; Portland Body Works, Portland, Ind. (repeat order); Imperial Wheel Co., Flint, Mich.; Bimel Spoke and Auto Wheel Co., Portland, Ind.

Importance of Getting the Right Kiln

The importance of selecting the right dry kiln for an automobile body factory cannot be over-emphasized. The dry kiln becomes a large and important part of the factory and it must be right in order that the whole may be right. Wideawake manufacturers, we are glad to say, are appreciating these facts a great deal more every day. They are going to a great deal of trouble to ascertain just what the best method is and are learning to discriminate very clearly between honest evidence and mere bunk.

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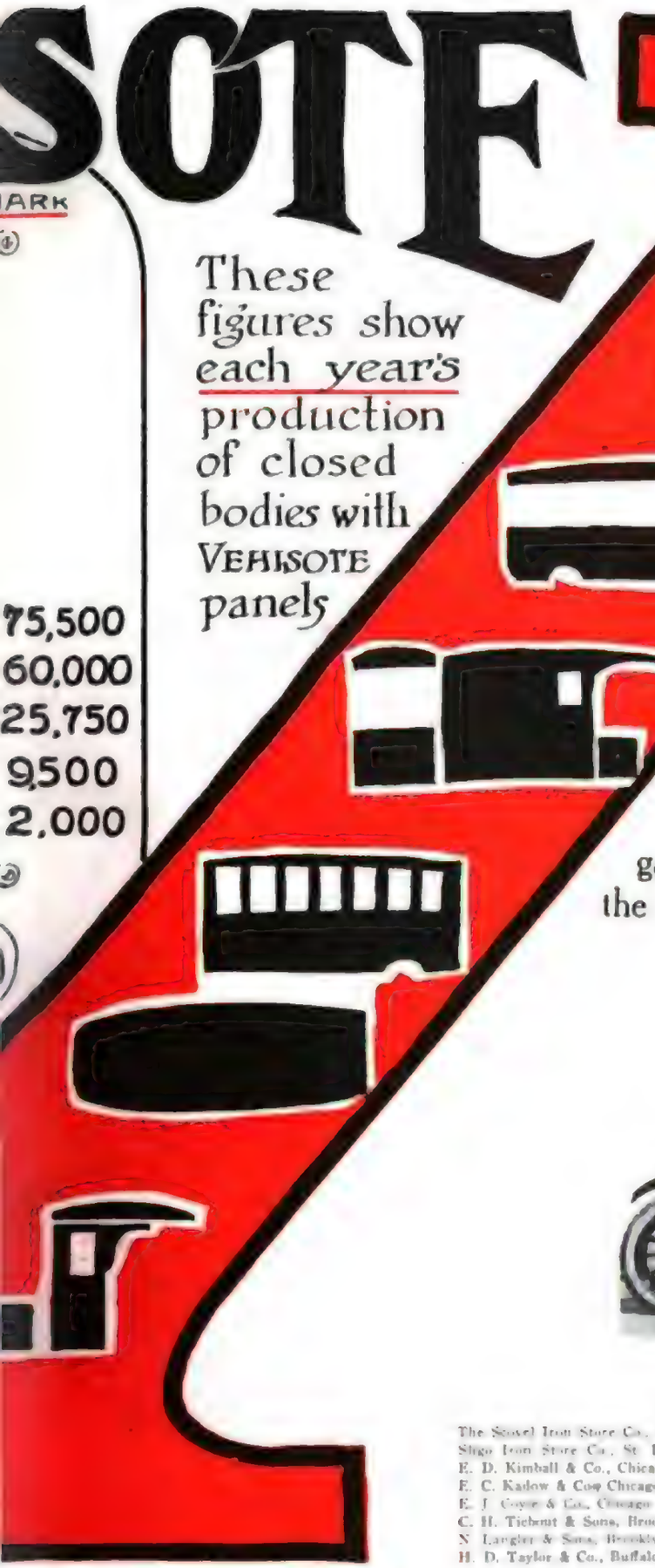
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Working Draft of Four-Door Sedan

Fitted to a 136-inch Wheelbase Chassis

The length of this chassis from rear of dash to center of rear wheels is 95 inches; length from rear of dash to rear end of frame is 125 inches. The upper surface of frame is 27 inches from floor when loaded.

The entire length of body is 120¼ inches, divided as follows: From rear of dash to front door lock joint, 18 inches; width of front door, 28½ inches. Size of standing pillar, 1¼ inches; width of rear door, 30 inches. From hinge door joint to rear standing pillar, 30 inches; from standing pillar to rear end of side quarter, 12 inches. The height of body is 28 inches from bottom surface to belt rail, and from belt rail to upper edge of top rail 29 inches, with 2 inches curve across, making the extreme height of body 59 inches.

The five seats are spaced as follows: From front of dash to front edge of seats, 28 inches; depth of front seat at bottom edge, 21 inches. Between back of front seats, at bottom edge, to front edge of small auxiliary seat, 14 inches; depth of auxiliary seat, 16 inches; space between the auxiliary and back seat, 8 inches; depth of rear seat, 23½ inches. The space between the two front seats is 8 inches and the space between the two auxiliary seats is 10 inches, shown on half top view. Double this space on 4 and 5 inches, making 8 and 10 inches, shown on half top view.

The dimensions across the front and rear of frame are 30⅛ inches and 40¼ inches, respectively, out to out.

Measurements Across the Body

The widths across the body are as follows:

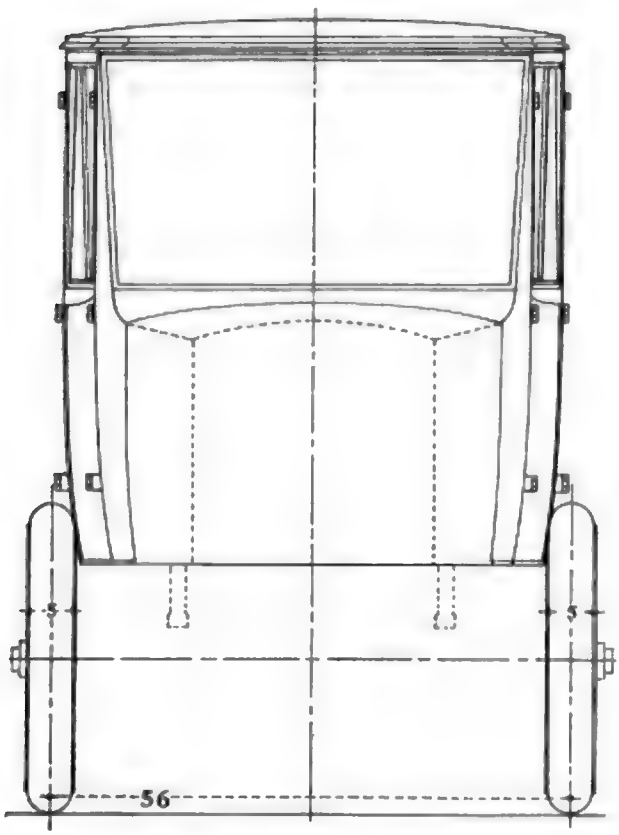
	Inches
Across front of cowl or rear of dash	41
Across the angular front at base	44
Across the two angles on top rail	40
Across front door joints	47
Across front door hinge joints	52
Across back door hinge joints	54
Across rear window standing pillars	51½
Across back corner pillars	49⅝
Across the lower part of back corner pillars	47
Across wheelhouse, between recess	47

Half of front and half of back elevation on working draft give the shape and amount of turn under, shape of angular front, position of rear end window, and shape of bonnet in dotted lines, and shape of rear lower panel in heavy lines. The angular front is made of metal.

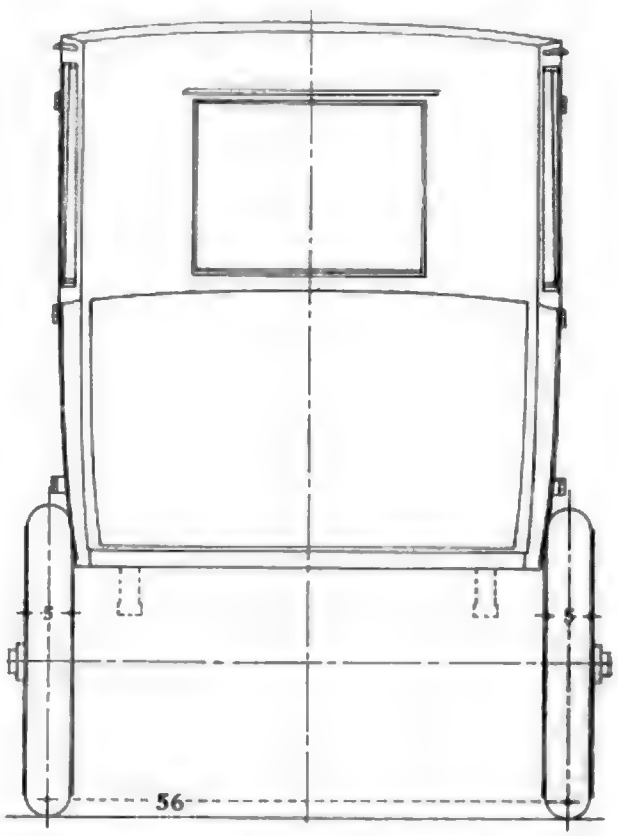
Construction of the Body

The cowl, lengthwise and vertically, has the same shape as the rest of the body, except that the lines are less curved. The top cowl panel is straight lengthwise at center of body and concave at the ends, joining with the cowl side pieces. The styles of automobile bodies have been considerably modified during recent months, this being evidenced in the changing of curves to straight lines. This tendency toward straight lines has cut short a great deal of labor and expense. For instance, the lower door moldings on automobile bodies, which were a matter of course on carriages, such as broughams and coaches and on wood paneled bodies, took a great deal of time to fit around the curves of the door edges and are at present replaced with flanges only. These flanges lap over the side panels same as the metal door moldings did, and with the aid of machinery the flanges and laps are made quickly and accurately and when screwed to the doors are classed as first-class work.

There is a ⅛ inch space, when the car is painted, between the side quarter panels and the door flanges which lap over the side panels, producing better work than the old style metal door molding, made either of soft iron, or brass. The only objection made by body builders is that they look too flat.

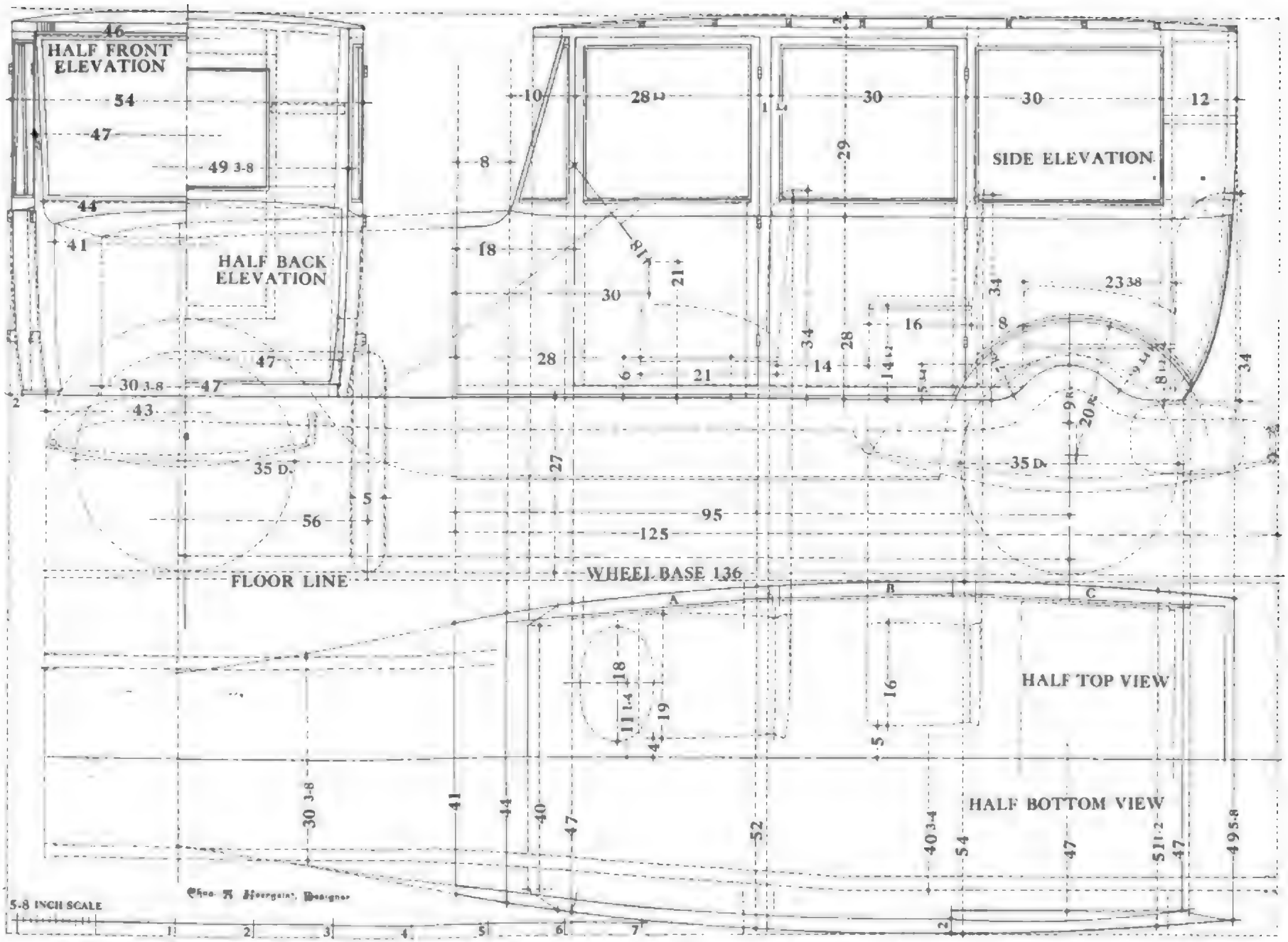


FRONT ELEVATION OF SEVEN-PASSENGER SEDAN.



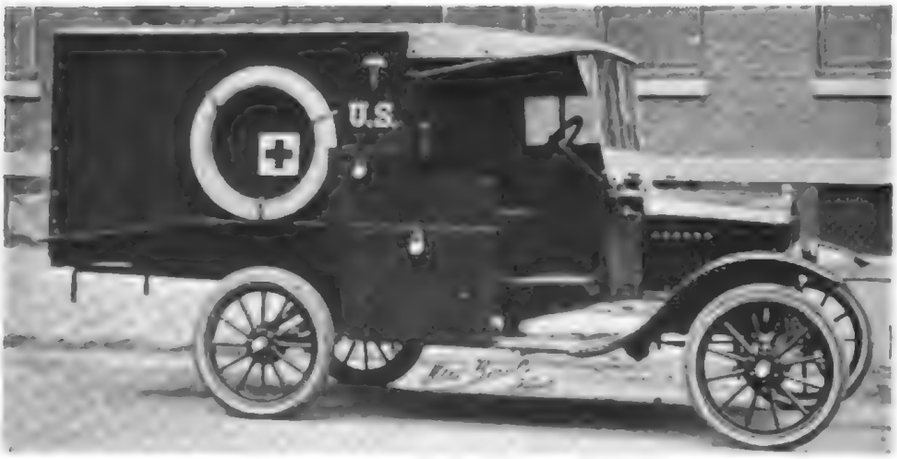
REAR ELEVATION OF SEVEN PASSENGER SEDAN.

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WORKING DRAFT OF SEVEN-PASSENGER SEDAN, CONTAINING SIDE ELEVATION, HALF FRONT AND HALF BACK ELEVATIONS, HALF TOP AND HALF BOTTOM VIEWS; INCLUDING ALL THE NEEDED DIMENSIONS.

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UNITED STATES ARMY AMBULANCE BODY.
Built by Lyter Wagon Co., Philadelphia, and mounted on Ford Chassis.

These flanges could be raised same as the old-time carriage moldings, but the majority of automobile body builders prefer the flat kind, as a saving is made also in the painting. It takes time to rub and finish the round raised moldings.

In many cases the lower sill moldings are dispensed with. Note also the hood and cowl; on some of the old style bodies the hoods and cowls were very much twisted, but at present they are either round or partly rounded, with an upper corner on each side, starting at the angular front and ending at front of hood.

A noticeable change has been made at the rear corners of the body. Twelve or fifteen years ago the rear round cornered bodies were imported from Paris and later made in this country. There was never a body style which held its own so well as the rear round cornered body, but a start was made at the 1918 New York Salon Exhibition, toward the present styles when straight lines and angular corners were incorporated on a sedan body; since that time the angular design has been adopted on other styles. There is less work in building angular cornered bodies than those with round corners.

Upon the introduction of angular corners a change was made in the amount of turn under. Years ago bodies were made with 6 inch turn-under or more, but this was changed when the side glasses began to be lowered and raised by mechanical means. Another great change was made in touring car body styles, on which the moldings were discarded entirely, top and bottom. The upper surfaces were rounded and the metal bent over. The edges of the metal were fastened on the inside surface, and the joint concealed with the trimming material. Later the rounded surfaces were beveled, but the metal was turned toward the inside same as on the rounded styles; but the beveled edges, as yet, have not become as popular as the rounded edges.



BAKER'S RETAIL DELIVERY BODY ON FORD CHASSIS.
Body Built by Lyter Wagon Co., Philadelphia.

Superiority of American Windshield

Windshields were formerly copied from the French imported cars, but the American accessory trades have changed and improved them in important details, so that American windshields are far superior in workmanship and appearance to the foreign article. The inclined front as a part of the body has been discontinued, and because now made of metal have a very light appearance. Besides it takes less time to fit them than when made as a part of the body.

The auxiliary seats as fitted in automobile bodies in the early years of the industry had their styles and construction derived from carriage work. The first real improvements were copied from French and German automobiles, but later the seats were improved by American automobile body builders and now are superior to any foreign productions of which we have knowledge.

Great improvements have been made in permanent, convertible and demountable top construction, but simplified in their parts and improved in their movements. The same improvement is apparent in the methods of covering the permanent top. The old style of covering with poplar boards, canvas or duck has been discontinued and vehisote or Haskelite plywood are largely used. These need no canvasing and can be painted same as any other panel and expenses reduced.

The sills on this body are 2 inches thick, and 7 inches wide, they are contracted toward the front as they must follow the inside flange of frame to support the sill. These sills are framed of three pieces on each side on account of the wheelhouse curve, lapping over the curve.

On account of this curve the length from rear of dash to center of rear wheels, and amount and shape of curve must be correctly taken. Even by doing this the dimensions may vary, and especially on old frames when new bodies are fitted on them. To make a perfect fitting to a frame which has settled from long use, the body maker makes a pattern fitting it directly on the frame, and not only to one side but to each side of the frame, marking them right and left in case one frame member has settled more than the other. Any difference in the frame is thus taken correctly and such patterns serve the body maker in producing his working draft. If the frame has different shapes on each side, two different patterns must be made for the sills and then the body will fit to the frame without leaving an opening the entire length of frame, as is sometimes seen.

The door and standing pillars can be dressed square with the inside contracted lines A, B and C, half top view, or square across the body as shown on half bottom view. On each side both doors open. The standing pillars between the doors on each side are only 1¼ inches thick on outside surface and with the large windows provided the car can be used during all seasons of the year.

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How to Distinguish Black Ash from Commercial White Ash Lumber

Black ash is considerably lighter, softer and weaker than any of the commercial white ashes—namely, the true white, green, blue and Biltmore varieties. For this reason, it is desirable in many cases to have a means of distinguishing black ash from white ash lumber. The following key has been prepared by the Forest Products Laboratory, Madison, Wis., for this purpose.

Some of the differences between the two woods are to be noted by ordinary inspection. Finer structural differences may be seen with the aid of a hand lens magnifying about 15 diameters. As an additional aid to identification, a diagrammatic drawing showing the structure of black ash and white ash may be obtained from the laboratory upon request.

General Structure of Ash Wood

The ashes all belong to the group of "ring-porous" hardwoods, having one or more rows of large pores or cells formed at the beginning of each year's growth or annual ring. The pores are much larger than the other cells or fibres which make up the annual ring, and their arrangement causes the appearance of conspicuous concentric rings on the end grain of the log. The portion of each annual ring which contains the large pores is the springwood, and the denser, darker-colored portion the summerwood.

Width of Sapwood (wood next to the bark)

The sapwood of black ash is narrow, usually less than one inch wide. The sapwood of the commercial white ashes is several inches wide.

Color of Heartwood (wood in center of the tree)

The color of the heartwood of black ash on a fresh cut across the grain is difficult to describe otherwise than as plain brown, sometimes faintly tinged with olive. The heartwood of the white ashes is usually lighter brown, and often has a reddish tinge.

Shape of Springwood Pores

A careful examination of the large springwood pores of the ashes, as seen on a smoothly cut surface of the end grain, brings out the fact that the majority of the pores in black ash are oval rather than round in outline. In the white ashes, on the other hand, the pores tend to be more nearly round.

Tyloses

A further aid to the identification of black ash is the fact that most of the large pores are open. This gives the wood the so-called "porous" look which is characteristic, for instance, of red oak. As in the case of true red oak, it is possible to blow soap bubbles through the large springwood pores of black ash. This open character of the pores is due to the fact that they, for the most part, are not closed by tyloses. Tyloses appear as glistening, often rainbow-tinted, fragments here and there in the cavities of the large pores. If they are present in black ash, tyloses are usually few and widely scattered. In the white ashes, on the other hand, tyloses are very numerous. They may even occur in narrow rings where other distinguishing characters are not well developed. It is usually impossible to blow soap bubbles through the heartwood or inner sapwood of white ashes, because most of the large vessels are closed by tyloses.

Care must be taken to distinguish broken fragments of the cell wall which may resemble tyloses but are produced by the use of a rough or dull knife in cutting. If a fresh, very smooth cut is made across a doubtful surface and the pores still appear closed, it is safe to conclude that tyloses are present.

White Lines in the Summerwood

An examination of the outer or last-formed summerwood of the white ashes reveals very fine broken whitish lines which run almost parallel with the annual rings. These fine lines are of parenchyma tissue, which is made up of groups of thin delicate cells. The lines are very variable in appearance, being especially conspicuous and long in the widest annual rings of the white ashes and sometimes absent in the narrow rings. The parenchyma projections are almost never present in black ash, so that the summerwood presents a plain, unfigured appearance.

The following tabulated summary of the difference between black and white ash may be found convenient for reference:

Summary of the characteristics which may be used to separate black ash from the commercial white ashes.

	Black Ash.	Commercial White Ashes.
Av. wt. per cu. ft. 15% moisture.	35 pounds.	40 pounds.
Width of sapwood.	Usually less than 1 inch.	Several inches wide.
Color of heartwood.	Plain brown tinged with olive.	Grayish to reddish brown, often pale.
Shape of pores or vessels on cross section.	Usually oval.	Usually round.
Tyloses in inner sapwood and heartwood.	Usually absent. Scattering if present, Very rarely numerous. Pores usually may be blown through without difficulty.	Always present, usually abundant. Usually difficult or impossible to blow through pores.
Fine white lines (parenchyma projections) in the summerwood.	Very rare, fine and usually short if present.	Variable but generally present; frequently long and very prominent.

Case Hardened Lumber

(Continued from page 23)

by proper manipulation in the dry kiln. Kiln operators should learn the meaning of case hardening, its cause, and how it may be detected before the lumber is removed from the kiln. Directions for making case hardening tests may be obtained from the Forest Products Laboratory without charge.



FIG. 1.—Shows the seating arrangement for the six passengers in rear compartment.



FIG. 2.—Shows how the folding seats fold into the back of the front seat, also shows small compartments above the seat for miscellaneous articles.



FIG. 3.—Shows the luxurious rear seat; also shows heater, foot rest, rear corner light and dome light.

LIMOUSINE SEDAN, FOR UNDERTAKERS, BUILT BY SAYERS & SCOVILL CO., CINCINNATI, OHIO.

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The Vehicle Monthly Course in Drafting and Construction

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Part E—Lesson 29. Non-Contracted Panel Seats

(Continued from pages 30 and 31, October, 1919, of "The Vehicle Monthly.") *(For description see page 37)*

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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Heergeist, Technical Editor and Draftsman of "The Vehicle Monthly."

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Subjects Treated in Previous Numbers

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" — "	14	One-Piece Metal Seat Panels	" — "	28	The French Method of Laying Out Square-Cornered Seats
" — "	15	Shape of Panel Taken Direct from Bottom View			

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Part E——Lesson 29

Non-Contracted Panel Seats

(For Working Draft see page 36)

Explanation. Fig. 29. The laying out or the construction of non-contracted seats is different from that of contracted seats in important particulars. On the latter the amount of contraction must be lengthened on front end of side pieces, and shortened on the back piece, which changes the diagram considerably. This will be explained in Fig. 30.

Points A, B, C, D and E, side elevation, are the outlines for the side surface of seat; points A D if the upper edge of seat is horizontal; points B D when the seat is lower on front end. C E is the base of seat, which is horizontal on seat frame. Points F G, F G, are the side inclinations shown on back elevation; the same inclination is also shown on points H I. Draw center line for bottom view, take width from center line to point F, back elevation, and place it from center line to point H′, bottom view.

Then take width from center line to point G, back elevation, and place it from center line to points I′ E′, bottom view. Connect point H, side elevation, with point H′, bottom view, same with points I I′; also points J J′. Draw horizontal from point H′ to point D′, bottom view; connect point D, side elevation, with point D′, bottom view; also draw horizontal from point I′ to point E′, bottom view, and connect with point E, side elevation. Also connect A with A′ and B with B′ from side elevation to bottom view.

Connect points F G, F G, back elevation, crossing the center line at point K, down to points L L. Connect points A C, D E, side elevation, down to point L′. The distance from points A D to base of L′ in a square direction must coincide with line F F to base L L, back elevation. In other words, both must be equal in length. Square up point L′ to point L. Connect points D′ E′ in a diagonal direction, crossing center line at point K to point M; also connect points A′ B′ and I′ with M, bottom view; do the same on lower side of bottom view. The distance from points M M, bottom view, must coincide with points L L, back elevation.

Increasing the height of side elevation to the amount of side inclination and also for back piece of seat has been explained in other lessons. The principle is the same on all of them.

This also holds good when the seat is covered with metal in one or more pieces. The dimensions taken either from bottom view or back elevation are the same as on others. All needed lines are established on the diagram needed in practice.

Note inclined line H, I, J, also F G, back elevation, representing the side inclination on the diagram. This inclination is always shown on drafts and diagrams in a vertical direction. For instance, the inclination starts from vertical line on points C N, side elevation, and not from line C A. This is indicated by line B extending over to point O on vertical line C N, side elevation.

Problem. Fig. 29. Draw two diagrams, both alike except the metal panels. In one draw the metal panel on bottom view and on both sides of center line, making it full length instead of half length. On the other diagram draw metal panel on back elevation full length; this makes the diagram plainer to the student. Cut a block with same inclinations as diagram, bend a paper over it, mark the edges, cut them to the pencil lines and compare with the diagram.

PART E—LESSON 30 WILL APPEAR IN THE DECEMBER NUMBER OF "THE VEHICLE MONTHLY"

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Painting and Finishing

The Day's Work in the Stock Room

One of the busiest corners of the shop is that in which the stock and supplies are kept and prepared and handed out. In the case of a business employing anywhere from eight to fifteen or more men, the stock-keeping department should have a space partitioned off from the main room or rooms, with a sliding window in front and a counter back of this across which the supplies may be handed out, tools distributed, etc. The door should be equipped with a lock and key.

If the business is not big enough to warrant the employment of an experienced man to be detailed for this work, and to have no other duties aside from those which belong to taking care of stock and tools, mixing paint, etc., handing out supplies and performing such other duties as belong to the stock-keeper, some reliable and experienced member of the working force should be authorized to have charge of the supplies, give them out as occasion requires, and exercise a general oversight of the department. This will prevent much waste, waiting for stock, etc.

It may be that even if the shop fails to transact sufficient business to keep a regular stock-keeper busy in this department, the employe put in charge of it can make himself useful in various capacities about the shop. As a rule, there are numerous duties coming along daily to engage the attention of an extra man, and all such affairs can be taken care of by the stock-keeper.

The man in this department should be charged with maintaining the tool equipment, including brushes, putty and glazing knives, sponges, wash leathers, pails, dusters, containers, sandpaper, rubbing felts, etc., in efficient and workable condition. He should also be held responsible for the proper condition of all material to the end that no wastage ensues. Containers after being opened should be given attention in order that the contents may be utilized to advantage, without waste or loss of material.

The workmen should not have indiscriminate access to the stock-room; such a practice, if permitted to go on, will inevitably produce a lack of discipline without which even the small shop will run aground presently. This practice of holding one man responsible for the mixing of all paints and colors, furnishing them to the brush hands, handing out tools, etc., is the only satisfactory way of handling this particular part of the painting business.

And while alluding to the matter of giving proper attention to the details of the inner life of the stock room it should not be overlooked that the slush keg has no standing, or rather should have no standing about the place; for plainly it is a pest. At least the big one overflowing with paint scraps is.

We do not suppose that the slush keg or "catch-all" can be entirely banished from the paint shop, but it can be reduced in size and quantity of contents. So far as possible the good stock-keeper will see to it that these left-overs are worked up and made over into something useful for rough work. If this is practiced the slush keg will be in large part only a memory about the place.

In the stock-room we should have a paint mill through which to grind some of the coarser pigments, such, for example, as roughstuff. If bought ready for application this will scarcely be required, but if shop mixed, as it so often is, it will be found an excellent thing to take the roughstuff in a semi-paste form and, setting the mill down fairly tight, run the pigment through at a moderate speed. This will serve to close up the ingredients, refine them, insure a more uniform distribution of ingredients, and work the material down to a finer shape, all of which helps to give it a better quality; and in turn this provides a better quality of work.

There are other coarse pigments which by running through the mill can be made more uniform and smoother working and more adaptable to a general line of painting work.

The stock-room is closer to a correct index to the profit or loss account of the business than one might at first thought admit. A wise foreman painter once said that it is easy to waste in the stock-keeping department all the profit made in all other departments combined.

One of the old-time forms of waste consisted in allowing the small containers when once opened to go unprotected as to contents, thus permitting them to be dried over through the action of the air. In large part this has been avoided through the use today of the color container equipped with top pressure device, etc. When contents of the pigment containers are exposed to the air they should have the protection of turpentine floated over the top of the container. All such containers will have the daily attention of the stock-keeper.

Brushes, too, merit the close daily attention of the man in charge. Good brushes are expensive enough—certainly, at this time—to demand the most circumspect caretaking. Every brush deserves to be most expertly groomed and given a daily look; they should after use go to their place in the keeper clean and fit for instant use. As a matter of fact, the stock-room, like the office and accounts, is a main artery of the painting business.

Painting the Car in Light Colors

One of these is straw color. Now straw color is a rather "summery" pigment and unless it can be striped some it may look chilly as the season grows apace and the frost comes on the pumpkin. But a fine, clean straw color brought up over a well-surfaced car makes a showy field; then stripe with a couple of ⅛ inch lines of olive green, or a medium shade of ultramarine blue, or two fine lines of Tuscan red, or the same red glazed with carmine. There are many other variations from these colors for the straw color, but these are especially attractive.

This color and for that matter all light colors—creams, ivory white, canary yellow, etc—invites the greatest care possible in handling and application in order that finger stains, greasy effects, and dirt blemishes in general may be avoided, for these are absolutely ruinous to the appearance of the color.

All the way along, from first coat to last, extra care should be observed in keeping the color clean. A dirty streak will not infrequently show through a couple of coats of the color.

Building Up the Under Surfaces

In the building up processes it is important to get a good share of the surfacing performed early in the construction work. It is easier to have this rubbing and sandpapering done before the real refinement of coatings is taken over, although as a matter of fact the refinement must begin at the beginning.

The puttying had best be done upon about the second coat of material, whether new or old work; this putty should be colored with some of the yellow in order to make certain of getting it out of the way of the final field color. There should be a good surface to start with; indeed, a good surface before the start is made. If an old surface it should be made clear of all fractures and surface roughage and then sandpapered down smooth as a bit of ivory. That is a long step and will be a great help at a later stage of the finish. Then it becomes a simple matter of keeping everything smooth and making it level as the work proceeds.

The straw color, cream, ivory white and some of the other very light and delicately toned pigments belonging to this class will, all things considered, do best over a blank white ground. The preliminary stage of surfacing and building up can be done with the white and after getting a blank, dense color and the good surface condition so desirable—in fact, indispensable—the straw color, or other light color of that order, can be applied in a flat mixture for the first two coats, after which varnish-color coats will be in order. Always finish with a water white varnish.

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Systems and Methods Used in Drying Varnish

Varnish drying systems are numerous, and run all the way from the hot air superheated room through to the gas and electrically-heated oven. In numerous shops it is customary to employ stove or hot air furnace heat, or steam heat, for the purpose of bringing an extra amount of heat into the varnish room. This plan, in the absence of baking ovens, works out very well indeed, and it enables the painter to get out his varnished work considerably sooner than he might otherwise do.

As a matter of fact, it is the practice in some shops to use this extra quantity of hot air in the drying of practically all the coats of paint and varnish, a plan, readily to be seen, which speeds up the output, other things being equal, to a most decided extent.

At any rate, for all hurried work—and much of the work is today in this class—the superheated paint or varnish room may be considered a big factor in the business of painting vehicles.

In the matter of ovens which are employed in the large factory paint shops, and in many of the large city custom shops, there are two types of heating—gas and electricity.

Such heated ovens are also of different types. They are of the semi-continuous and continuous conveyor type, the truck operated or box-oven type, and the hand-operated kiln or box-oven type.

The use of the semi-continuous and continuous conveyor type is confined to the large factories. The truck-operated type permits the finished work to be carried into the open on trucks, and the hand-operated type provides for the work to be hand-carried into the oven.

The latter type is, of course, the most expensive of the types here mentioned, for the reason that the work must be carried in by hand and this requires maintaining the heat at a much lower degree than if it were taken in by truck or conveyor.

In the hand-operated oven the doors must be opened and the apartment be cooled down to at least 150 degrees. Then before the oven can be again filled the temperature has still gone down, and not infrequently as low as the ordinary room temperature. This explains why the big shop baking equipment can be made so much more efficient and productive.

When the truck-operated system is employed it only requires about five or ten minutes to load the oven. The semi-continuous type is not much more efficient, at the most, than the truck-operated oven.

In the big automobile factories the continuous conveyor is the type principally used. This type of oven operates continuously at one temperature, requires the least possible amount of ventilation, and the conveyor is of minimum weight.

These continuous conveyor type ovens have been checked up to show that they have an efficiency practically double the amount of the other types here alluded to.

Now as to the value of the gas and electrically heated ovens, compared from the efficiency and operating point of view, it has been shown, we believe, that the electric oven is clearly in advance. It is the latest word in baking ovens. It is cleaner, for one thing, and is said to be practically free from contaminating gases and exhalations, and affords better appearing results. While the cost of operation is reported to be slightly more than that of the gas oven, the efficiency is more than sufficient to counterbalance any extra cost.

There are, manifestly, many makes and kinds of gas ovens which are exceedingly efficient with a large producing capacity. We have in mind such ovens, which for the drying of the varnish-color coats are heated to 110 to 120 degrees, with 90 to 100 degrees of humidity, with a renewal of fresh air every three minutes, by means of an exhaust fan.

The air used is all water-washed. Thermostatic control regulates the temperature and water control on a diaphragm regulates the humidity. The water-washed air enters the oven by being pumped in by a fan blower and is superheated by contact with a radiator.

This humidifying of the air virtually reverses the air drying method because with this latter plan the exterior is the first coat dried, whereas with the moist air the inside coat is the first one dried.

In these ovens, or in some of them, at least, the finishing coat of varnish is subjected to a temperature of 100 degrees or a little more, while the humidity runs at about 70 degrees. Many of these ovens are set within the varnish room so that when the varnish has been applied the oven can be opened and the work placed within with practically no chance for the entrance of dust or dirt.

In many varnish rooms the walls and ceiling are oiled with paraffin oil. Whatever dust may stray into these rooms is caught by the oiled walls and ceiling and held in check. In these establishments the workmen are required to wear specially-prepared clothing which absorbs any dust against its recirculation in the air. The floors are also oiled and to the last degree means are taken to provide absolute cleanliness.

The degrees of temperature at which the varnish-color, rubbing varnish and finishing varnish are baked vary considerably with different shops. At from 120 to 125 degrees for an exposure of about four hours the clear rubbing varnish coats are baked, and in other plants the degree of temperature is run higher and the baking is completed in a shorter period.

In the baking oven operated at Altoona, Pa., by the Pennsylvania Railroad, the finishing coat of varnish is baked at the start at 125 degrees and from this point is run rapidly to 150 degrees, at which it is baked for a period of three hours.

It is urged in behalf of the baking system that it permits the use of more elastic coatings and provides against the employment of any considerable amount of artificial driers and gums, thus furnishing a measure of durability of valid importance. Toward this claim, however, the writer has no substantial facts to give at this time in support The main consideration is that the baking system provides a method of acknowledged rapidity which in these days is all-important and often vital to the success of the painting business.

Referring again to the Pennsylvania baking plant it may be said, as an illustration of the rapid results secured, that ordinarily it requires fourteen days in which to paint and finish a coach, while with the baking oven the same work may be accomplished in half that time.

It is conceded that in all baking operations it is advisable to start at a moderate degree of temperature and then go on through to the extreme permitted. Experienced oven operators appear to reach the conclusion that a moderate heat applied for a longer period is productive of more lasting results and a better finished appearance than a short baking period at a high temperature. In other terms, the lower the temperature, consistent with circumstances and conditions, and the longer the paint and varnish is baked, the better the wear, service and resistance to moisture, and the more elastic the film.

Baking enthusiasts affirm that the resistance of paint and varnish, baked on the surface, to moisture, gases, atmospheric changes, etc., is in the proportion of two to one compared to the unbaked finish.

While in many shops the baking of the finishing coat of varnish is done in much the shorter time it is quite generally allowed that this class of varnishes, both body and chassis, will do finely if baked at from 110 to 150 degrees for from three to four hours, the lower temperature permitting a more protracted baking period.

The hoods and lamps of the car may have the coats baked, for enamel coats, at 180 degrees, for from four to six hours. Bake the priming coat on these parts at, say, 200 degrees for three hours. The average color, excluding white, may be baked for six hours at a temperature of 170 degrees.

Rubbing Varnish at its Best

Rubbing varnish is at its best only when it is given all the advantages at the command of the painter. The best surface results can be obtained only when the varnish is flowed on rich and full and then to the greatest amount possible left on the surface. Thus, through the medium of body, the fine finish is secured, as durability is secured through the same source. Quality and durability are both alike based upon a grand measure of varnish depth, which latter is gained only by leaving the greatest quantity possible on the surface. With this body of varnish flowed on in coats of fullness and bulk much of the fine drift or roughage is washed out.

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In thus building up a body of good depth it does not become necessary in the surfacing to rub to the last inch of fabric. The first coat of rubbing, in our estimation, is the vital turn of events for the finish. In large part this coat is the key to the entire after result. To the degree that it is clean and rich and full in body and lustre, you may expect under right conditions to have it prove an easy body of material to face down and give support for all those coming after.

This first coat of rubbing should get along with a small amount of rubbing; but the rubbing should be most uniformly performed. Perhaps a simple flatting of the varnish, a mere dulling of the lustre, will best suffice. Wash and clean up circumspectly and flow on a second coat in all particulars fully the equal of the first one. This coat will stand a heavier surfacing, to be sure, although it should not be necessary to closely scour the body.

The plan we have consistently followed for years has been to build upon the surface a very deep, rich body of varnish for the support of the finishing coat. This can be done, as above indicated, by flowing on all the surface will stand and rubbing as little as is consistent with requirements.

If the varnish is handled by a skilled varnisher the coats may be made both clean and rich, and plump of body. The cleaner the varnish the less rubbing will be required to fit it for the following coats, and so at the minimum rubbing operations we shall produce a foundation upon which to finish.

If anything, the third coat of rubbing—provided more than three coats are employed—will take a little heavier surfacing than those preceding, but this should not be overdone, for if the practice of keeping the coats clean has been carefully observed it is simply a matter of laying down the roughage drift and leveling down the body of the varnish and fetching out the satiny effect which good rubbing always produces.

In the old days which men seem glad to sing about it never appeared to occur to the rank and file to pile on all the varnish that the brush might carry, and as a consequence there was some brushiness to be taken out; these brush marks, bear in mind, came out hard and it required a lot of elbow grease, as the saying is, to fetch out these marks along with the dirt sifting in while the varnishing went on. It is a most satisfactory development of trade practice to see this type of work being cast into the discard.

In the rubbing and cleaning up of the surface it is a good plan to dip the rubbing pad into water only and give at the end of the surfacing a strong water rub. This serves to eliminate the pumice stone flour ground into the varnish as it sometimes is. It also helps to harden the surface and gives it a polish which the ordinary rubbing work will not suffice to give. Apply this class of rub on every coat at the end of the general rubbing. In this manner it will be easy to keep the varnish clean from any whitish effect.

(Continued on page 56)

Some Western Automobile Painting Observations

The western and middle west sections of the country are fast verifying the prediction made in these columns some months ago to the effect that the return of a greater amount of striping and ornamental features employed in the finish of automobiles might be expected. In a trip through a number of western cities, including Chicago and Kansas City, two notably fashionable centers of motor car painting, car striping effects were to be everywhere seen.

Most of this work appeared to be exceedingly well done and but very little overdone. In a great number of cases the striping was shown sparingly and always artistically. Broad single lines about the upper edge of the car body were in large favor; many of these were edged with a fine contrasting line of color. The two-line stripe—two fine lines thrown at a distance of one-half inch and often three-quarters of an inch apart—came in for much attention.

The striping colors used in practically every case were of a strongly contrasting color to the body color, and yet there were very few inharmonious selections. In the vast majority of cases the effects were strikingly smart and amply calculated to catch the eye.

The car body colors used were for the most part of a dark, subdued shade, greens, blues, maroons and deep browns and grays of numerous shades, predominating. And the selective work on surfaces carrying two different shades or colors could invariably be found most attractively performed.

The finish cast upon this great variety of work—speaking now of strictly high class cars—convincingly testified to the fine skill applied, and proves beyond question that vehicle painters "out West" are quite the equal of their brothers of the East. In nearly all cases minor parts of the car, so-called, had given exacting attention; so much so, in fact, that the critic could hunt long for a trace of carelessness. Car door edges, about the windshield, about the front of the hood, and everywhere that a workman might feel disposed to slight his processes, were finished, as a rule, faultlessly.

The chassis corresponded closely in quality of finish with the body of the vehicle. In this respect the writer believes the western painter has the advantage of his sunrise country brother, for it is a fact that not infrequently along Fifth Avenue the supposedly automobile art boulevard of America, one may encounter an occasionally shabbily finished chassis.

Some Attractive Striping Combinations

A good deal of study is being devoted to the most attractive striping for the automobile. A recent trip along "Automobile Row," New York, has convinced the writer of this.

Here are some of the colors displayed in the lining work: For example, a wide stripe around the upper edge of the car body painted dark blue shows a lighter shade of the same blue for the stripe. This light blue stripe is then edged with a fine line of ivory white. This makes a beautiful combination and does not fail to attract immediate attention.

Again, against a dark blue field a three-quarter inch line of a much lighter blue is cast. This stripe is edged with lines of chrome yellow, after which they are glazed with carmine, each line being done separately.

Starting with a deep green field a pure white line one-half inch wide is thrown about the upper edge of the body and over this a glaze of carmine or scarlet lake is flowed. This combination is distance fine-lined on either edge with a gold imitation that gives a glorious effect. Green fields take kindly to carmine lines, and of these the double line combination, with each line glazed separately, gives a telling effect.

It is never permissible for any class of work to use a broad pencil and include both lines at one drawing; that is, to cover both lines and the space between with the glaze. This always affords a cloudy effect and is strictly prohibited in first class shops. It reigned in the old days of finishing the factory buggy, but it was never even popular then, only as a cheap job proposition.

It must be borne in mind that the striping effects upon the motor car are manifestly superior to anything the horse-drawn carriage afforded in clearness and brilliancy of color illumination, and keeping this point in view should serve to assist the workman in developing his striping combinations.

Keep the distinctness of the colors, their purity and brilliancy prominent. The only way to do this is to arrange for the glazing effects to be rich without cloudiness and to avoid any smuttiness of pigments.

Plain gold lines of one-half inch, or imitation gold lines of the same width, make a kingly appearance upon the deep green surfaces, as they also do upon light or dark blue.

A field of ultramarine blue striped with a three-quarter inch line of cobalt blue, this line being edged with a hair line of Arctic white, yields a splendid effect. The same stripe is also becomingly set off with fine lines of gold. On fields of deep green a double fine line of Tuscan red is most attractive. Indian red likewise gives a very pleasing effect.

The Tice Motor Co., Indianapolis, has been incorporated with $250,000 capital stock to manufacture automobiles and accessories.

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What Is Good Color?

The practical and experienced painter will at once tell you that a good color is not necessarily a strong covering pigment, for it is well known that some of our finest and most brilliant colors are not strongly opaque. Indeed, not a few of them are very much transparent. Therefore, we cannot base our definition of a good color upon its capacity for covering solidly a surface at one or two coats.

Coloring power does not help us to define a good color, for the simple reason that some exceptionally fine colors are weak tinting or coloring pigments. What then, it may be asked, are the merits which must be a part of a color to make it efficient?

The experienced painter, as a means of determining the quality of a color, will first break it up carefully in the container; he will add the turpentine little by little in order to have the atoms of pigment completely dissolved and blended into a soft, easy-flowing mass of color. Then with a brush in perfect condition he will proceed, after dusting off the surface most thoroughly, to lay on a coat of the color. The feel of the material under the brush will serve to inform him to a certain extent of its fineness; its working properties will be disclosed under the brush, at least.

Numerous methods are advised by various authorities for arriving at the percentage of fine grinding of the color, but as it is worked out over the surface the wise brush hand will find whether it is fine or coarse as to the grinding. Not only as it flows out under the brush may its merits in this respect be established, but as it dries, the quality, good or poor, will manifest itself, and a mere passing over of the hand, as the color lies dry on the surface, quite fully tells the story.

The good color, as we know it, is one which breaks up nicely and liquifies fully; that flows freely and richly under the brush; that dries out smooth and perfectly free from any gritty feel as the palm of the hand is rubbed firmly over it. Then, it must have brilliancy of effect both as a flat color and in the form of varnish-color.

A color that does not respond to the addition of varnish, if it is desired to convert the pigment into varnish-color, cannot pass successfully the inspection of the painter. This response should be in the nature of greater brilliancy, of a deeper lustre, of a more satiny finish. Covering power is to be expected of the so-called solid colors; of the others, a lack of this quality cannot be esteemed a demerit.

Getting a Surface Without Roughstuff

Can this be done? So queries a reader of THE VEHICLE MONTHLY, and we may say that it *is* possible, although we are not prepared to speak glowingly concerning the merits of such a surface other than to say it may be made durable.

For a fine, level, smooth, clean-cut surface, however, you must employ something more substantial than a well-brushed-on coat of preparation material over which the glazing is knifed and laid deftly.

Surfaces today for the automobile must, first of all, have depth of body, and this you cannot obtain from a brief outlay of brushed-on and knifed-in pigment. This treatment is quite sufficient for work that has no need of passing the inspection of the critical public when that public is bent upon splitting hairs. For quick method work the knifing-in method is justifiable; is to be commended, in fact, for many jobs of the ordinary sort.

When a high-class type of work is being considered a different attitude of mind must take hold of the reasoner. There is no pigment so well calculated to fetch up a surface round and full, and complete all the cavities and defects in a manner to permit the rubbing stone to lay down into a common mould and form the pigment applied.

It is true that upon small surfaces, where the exposure is not big and conspicuous, and where a strictly mirror-like effect is not the entire aim, the glazing pigment may in the hands of a skilled workman be made to perform really remarkable things.

Upon old surfaces, from which the paint and other finish has not been removed below what a hard sandpapering will accomplish, the glazing method, applied after a good, stiff dose of preparation stuff is put in place, is quite certain to bring out in the quickest possible way, and effectively, too, a foundation of decent proportions and as sound as a cart-wheel. In all such cases there is a good foundation holding fast and tight and upstanding, to support the finish.

Here, then, is an example where the glazing plan must work economically and to a good show for the finish. In the other cases we have only to say that roughstuff, made as good and fine as it was ever made in the old days, is the vitally essential article. It should not be furnished too heavy in body. And it should not be left brushy or coarse beyond what is in its nature and composition.

Lay the coats at right angles to each other to insure a close knit fabric. Let each coat dry perfectly. Keep the coats clean. Then rub them carefully for the development of a level and smooth finish.

Clean Work and Durability

It is a perfectly fair assumption that clean work—the clean finish, to put it more specifically—will prove more durable than work of the other type. Dirt in a finish takes up the space which otherwise might be occupied by varnish. This is a logical conclusion and is backed by facts rooted in the practical trade mind for a generation.

It is a simple law of chemistry. When varnish displaces the dirt and drift dust you may in every case depend upon the varnish to wear better than if this same space were taken up by all manner of surface accumulations. This is a main reason why clean work is certain to prove more durable than dirty work.

And as you stop to think it over carefully the fact will impress itself upon you that it is not, after all, such a difficult task to keep the surface clean if the work is kept clean from the beginning and taken along in this manner as the various processes are completed. It is never good practice to exercise carelessness even when the earlier processes are being brought along, for right here is where a lot of trouble is planted for future attention.

A good rule to observe consists of starting with a perfectly clean surface at the priming coat and continue to make it clean after sandpapering or rubbing, as the case may be, and before applying a further coat of material. By giving this kind of attention to the various operations as they are brought along it will prove a comparatively easy matter to maintain a good grade of cleanliness right through to the finish without any extra work.

Naturally there are numerous outside influences which are due to be considered. One of these is the shop and the immediate working quarters. A clean shop is a big asset when cleanliness is being accounted for. It is taken for granted that the shop, as shops go, is of a construction to permit cleaning. That it is cleanable, in other words.

Some shops, manifestly, are beyond the power of anyone to clean and keep clean; under such conditions it is entirely out of the question to do clean work, as a rule. But granting that we have a fairly good shop it becomes of first moment to get it clean and to keep it in this condition.

Uniform Varnish Room Temperature Necessary

One of the stern requirements of the varnish room is a sure measure of uniformity of temperature. The flare-up in heat is not desirable; is, indeed, a most unfortunate circumstance. It is one of the things in connection with the process of varnishing which deserves to be corrected forthwith. To allow the room to become hot and then cold, and to range along all the way between these two extremes, is to invite all the nimble-jointed agents of disaster imaginable.

If there is any one feature of varnish room management that stands out above others, and calls for intervention and a complete reversal of practice, it is this allowed fluctuation in the mercury. Of course, this involves a series of other matters which must have attention while making an effort to keep the temperature stationary.

There is the ventilation which, manifestly, must be of a good order. It is next to impossible—rather it is impossible—to maintain an even temperature in a room which is stagnant with foul air. Hence, we say, furnish complete ventilation at all costs.

That ventilation, of a choice, should be brought into the room from the ceiling through a ventilating apparatus leading directly out of the roof. At any rate the ventilation which comes from along the line

(Continued on page 54)

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Upholstery, Toppings and Mountings

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Upholstery, Toppings, Mountings

The Importance of Good Accessories

Nowadays, it is the body, with its tasteful painting, upholstery and mountings that sells the car. Body manufacturers realize that in every appointment up-to-dateness in all details is the criterion by which his product is judged and upon which his sales must depend. In no feature of the car body is there a greater opportunity to supply the customer winning elements than in the hardware and mountings. A few fine accessories will add to any car just those details that please the eye and influence sales.

Among the best makers who specialize in well-designed mountings of high quality is C. Cowles & Co., New Haven, Conn., who manufacture a very complete line for all types of closed bodies. As an indication of the extent of these lines the following items will be suggestive: Rubber-covered handles; ventilators; disappearing corner lights; dome and pillar lights; electric cigar lighters; security locking handles; concealed toilet cases; curtain rollers; speaking tubes; mechanical window lifts; anti-rattlers; "Banner" window locks; tail lights; filled moulding, curtain fasteners, etc.

This company will take pleasure in sending you a catalog covering all their lines of mountings and accessories, from which it is very likely some new idea will suggest itself as applicable to your own product.

Cotton Batts Reduce Upholstery Costs

Modern methods have greatly improved the art of upholstering automobiles, and one of the means whereby the improvement has come about is the greatly increased use of cotton batting in seats and cushions. Not only has the employment of cotton batting improved the upholstery structure, but it has lessened manufacturing costs at the same time. Cotton batting lies perfectly flat, and insures the correct flatness of finish now so much in vogue.

Of course there are several grades of cotton, and not all goods are suitable for the trimmer's work; only pure, long fiber, resilient stock is desired by the trimmer who knows his business. Cotton that lumps or separates is not the kind that gives satisfaction.

Cotton batts for automobile upholstery should be specially manufactured for that purpose, so they will not pack or become soggy. Such specially prepared cotton is the kind used in high-grade furniture upholstery, and which is fast pushing other materials out of the better grades of automobiles. It is true that cotton is cheaper than some other filling materials, but this is not the real reason why cotton is being so largely used in motor car factories. If economy were the only reason for its use we would not find it in so many high-grade cars where such economy is unnecessary. The fact is that cotton, for certain parts of the upholstery, is better than other materials, regardless of cost.

The manner in which cotton batts are produced by the Little Falls Fibre Co., Little Falls, N. Y., makes less work for the upholsterer, and in many shops permits the employment of women and girls, reducing labor costs materially.

There is no waste of filler when using cotton batts, because they can be cut to the exact size required, and can be had from the company named in either rolls or pads, and in any size or weight required for the work in hand. A liberal sample will be sent to any body manufacturer or trim shop foreman upon request to the Little Falls Fibre Co., Little Falls, N. Y.



"Cock Brand" Upholstery Materials

Automobile and truck body manufacturers who desire dependable goods made by a company with seventy years' experience behind them are referred, in the matter of ducks, drills, tarpaulins and rubber cloths to the old-established firm of Edmund F. Heath & Son, Newark, N. J. There is perhaps no better known trademark in these lines than the "Cock Brand"; which insures extraordinary high quality of any goods upon which it is stamped. Oiled back ducks, black enameled ducks and drills, black oiled duck, tarpaulins and rubber cloths are made by this concern and sold and guaranteed under the "Cock Brand." Edmund F. Heath & Son will take pleasure in submitting samples of their goods to body builders.

Parsons Mfg. Co's Rapid Growth

Accustomed as it is to big things, the automotive world passes lightly and oftentimes loses sight of many of the real developments that are daily taking place in this wonderful industry.

Like the giants they serve, the Parsons Manufacturing Company, Detroit, Mich., starting small, have steadily grown until today they are one of the largest producers of automotive body hardware in the country.

The main business of the company is the manufacturing of hinges. These hinges are supplied in all shapes and styles, grades and finishes from the inexpensive light ones to the heavy, more costly kind. Concealed joint hinges—open and closed body door hinges—deck hinges—commercial car hinges—in fact hinges of every description are a part of the Parsons line.

Equally complete and attractive is the variety of locks—ranging from the semi-finished stamped kind for ordinary cars and trucks, to the highly nickel-plated

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ones fit for the finest limousines. Every demand can be satisfied with a Parsons product.

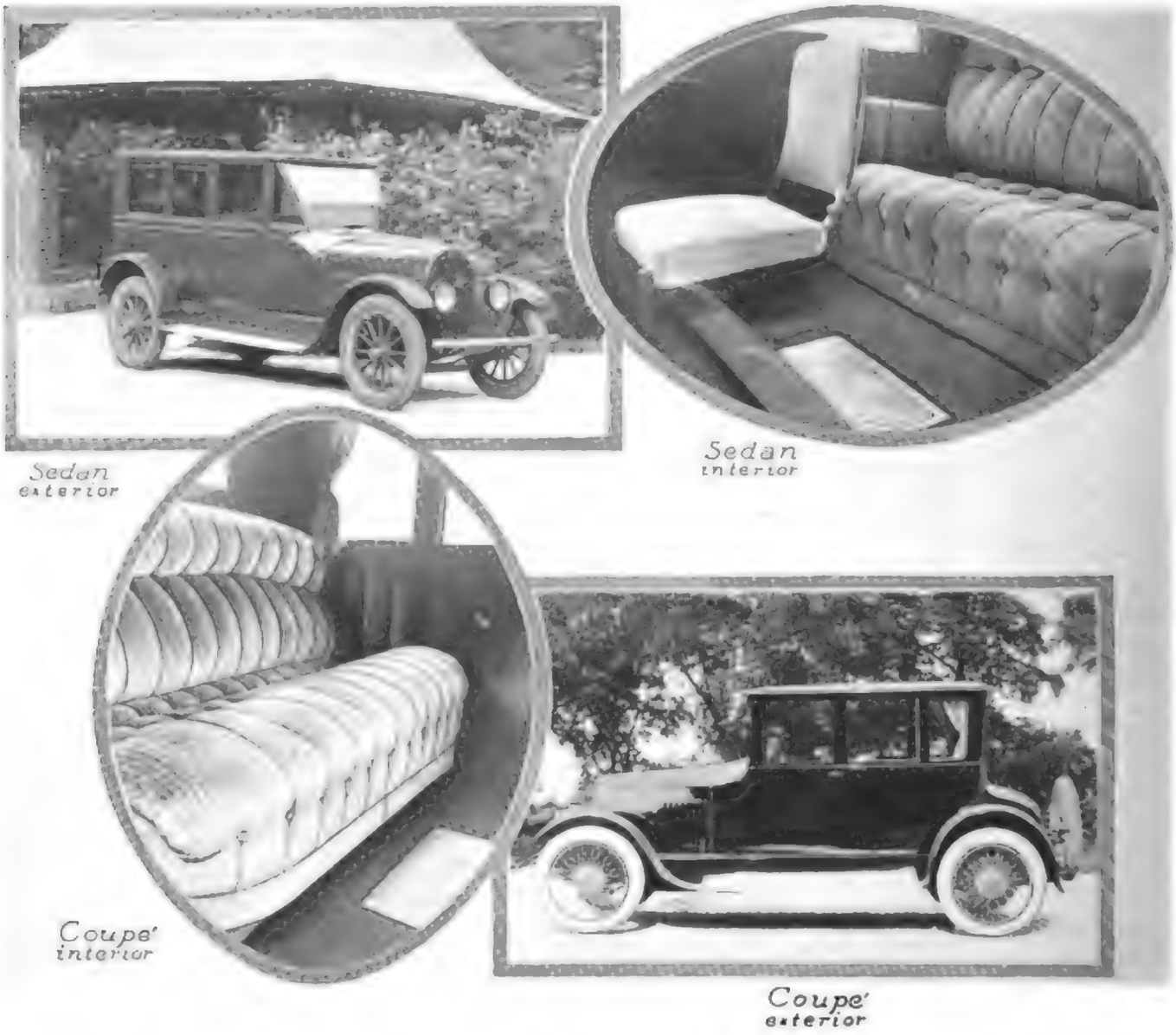
The builders of Parsons products being practical body men themselves have seen the needs of body manufacturers and have anticipated them in their body fittings. Because of their simplified design and construction, Parsons hinges have made door hanging an easy operation.

The popularity of Parsons products is at once evident by a glance at their production figures. On hinges alone, over a half million are produced each month, these being used to hang over 80 per cent. of all automobile doors.

A new factory now gives the Parsons Mfg. Co. 30,000 square feet of floor space and an acre of ground allows for further expansion. Adequate railroad facilities serve the entire property.

To better acquaint the trade with their complete line the Parsons Manufacturing Company has just gotten out a comprehensive hand book which pictures the different types of hinges, locks and other articles they manufacture, and gives practical data as to size, etc. These catalogs are being favorably commented on.

A request directed to the company at Detroit will bring interested concerns a copy of this hand book.



NINETEEN-TWENTY UPHOLSTERY STYLES AS EXEMPLIFIED IN THE NEW APPERSON CLOSED CARS.

The Automobile Lamp Industry

The lamp industry, as well as other industries accessory to the automobile, has undergone many changes in the last decade. In the old days, when we had only horse-drawn vehicles, kerosene lamps were used almost entirely.

But kerosene was not practicable for the speedy automobile and the acetylene lamp was introduced, giving very good results. Of course, lamps had to be devised for this gas, and their manufacture caused the first great change in lamp design.

When ignition starting and lighting systems were demanded by the motoring public it became necessary again to design suitable electric lamps in styles to harmonize with the general lines of the car. This happened in 1912 and 1913, and from that time until the present the combined lamp factories in the United States have had a fivefold increase in their business.

Now, there are being made about 6,000,000 lamps per year for the automobile manufacturers, and the jobbers and retail dealers trade in this country. This business is distributed among a half dozen automobile lamp manufacturers, employing about 5,000 people.

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is the material that always looks well and wears well. It works well, too.

Send for a sample and ***give it the scrub test.*** That will prove its wearability

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Making the Tailor-Made Top

California has lost her monopoly of the tailor-made, rigid-frame automobile top. This top, the pride of so many wealthy West Coast motorists, is no longer enjoyed by them exclusively. Los Angeles, the city that gave the top to the motor world, must look to her laurels, for the tailor-made top is coming—has come—East.

Once a beautiful curiosity on the streets of New York, Cleveland or Detroit, the tailor-made top is now seen in these and other cities with increasing frequency. In fact it can now be built to order in a few of our eastern cities, if one wishes it and is willing to wait his turn.

We are sure that most of our readers are now familiar with the appearance of the tailor-made top, or, as it is often called, the California top. We are equally sure that some, at least, of our readers know very little about the construction of this top and have admired its distinctive elegance and individuality without realizing how its perfection of symmetry and beauty was achieved or much about its permanence and general good qualities. We have, therefore, reproduced here some photographs which give an idea of the general make-up of these tops.



Frame for Buick Roadster Top.

The frame of the tailor-made top may be compared to the skeleton of the human body. The padding, consisting of webbing, canvas, curled hair, etc., then becomes the muscles, and the outer covering of leather substitute, the skin of that body. Unless the frame is symmetrical and strong there will be deformity and weakness instead of strength and beauty.

Hence, before any work is started on a top, a skilled designer must lay out the exact size and shape of the frame. This he does with the most careful attention to the size and to all details of the design of the car on which the new top is to be fitted. This car is first stripped of its former top and accurately measured. Then after thoroughly considering its particular shape and construction and the owner's taste, the designer draws a full-size sketch of the proposed top. From this drawing the shape and design are studied and, if need be, altered until the designer is satisfied that the finished top will conform to and emphasize, with its smart shapeliness, the contour of the car body and make a pleasing combination therewith.

The design ready, the various sections of the framework are cut out, bent, drilled, fitted and assembled. Straight-grained hickory, when available, is used for the ribs and front and back bows, but oak, ash and other flexible, strong woods are satisfactory. The body curve can be of maple or any tough, hard wood. The rigidity of the top being absolutely essential, the utmost care is exercised to make all joints solid and substantial. Wrought iron braces are used where necessary as well as knee-irons to hold the ribs. These are held fast by bolts and screws.

When the frame is ready it is securely anchored to the body by irons which are attached so as to give the utmost stability to the top. The anchorage must be so perfect that no vibration of the top will be noticed when the car is in motion.

The next step is to install the inside mountings such as dome lights, mirrors and card cases. Then the lining is carefully tacked in position. This and all the subsequent steps of upholstering and trimming the top require considerable skill. The methods vary with different models and in different shops, but the object sought is always the same—a top that is distinctively graceful and that will always remain so.

This result is almost always attained by the skillful application of materials of the best quality. Ordinarily the rigid wooden frame is first covered with heavy webbing, tightly stretched. Over this webbing a strong canvas cover is tacked. Upon it is spread a thick layer of curled hair. Layers of cotton wadding are laid upon this curled hair and the whole built up into the desired shape. This stuffing is covered with muslin to keep it in position, and the top is then ready for outer covering. Often rear-side pieces of 28-gauge iron are tacked to the back of the top to keep the padding in place. Pads for the long sides of the top are sometimes made separately and then fastened in place, in which case only the center of the top is webbed and the upholstery built upon this webbing to meet the side pads.

The outer covering of the top with the sides and back neatly sewed in and the bat wings at the back attached, is stretched into place over the upholstery and firmly fastened down. The nickel-plated moulding applied to the front and back of the top is held in place by wood screws on each end and by long prongs through the entire length. All nickel trimmings are plated on solid brass to eliminate any chance of rust. Instead of nickel trimmings a finer effect is usually obtainable by making a special moulding covered with the same material at the top.

The inside of a rigid top of this type is usually very finely finished with some rich material that harmonizes with the color of the car. The most costly materials are practical for this work since there is no movement of the top to wrinkle or tear them, no sunlight to fade them and no possibility of the top leaking, if it is properly constructed and covered.

The covering material is of the utmost importance. Since, on the tailor-made rigid top there is no bending or flexing of the covering material whatever, it is apparent that what is most needed in such a material is chemical stability and immunity to deterioration from weathering. It must have the quality of keeping its strength and good appearance in spite of exposure. In California it was quickly found that a high grade of substitute leather, because of its pyroxylin coating, had this chemical stability to an almost absolute degree. It retained its flexibility and vitality, preserving its beauty after years of exposure to sun, rain, sand and alkali dust. It was not only waterproof but also greaseproof and stainproof. Cleaning it was a glad surprise, as all dirt brushed off or washed off with soap and water.

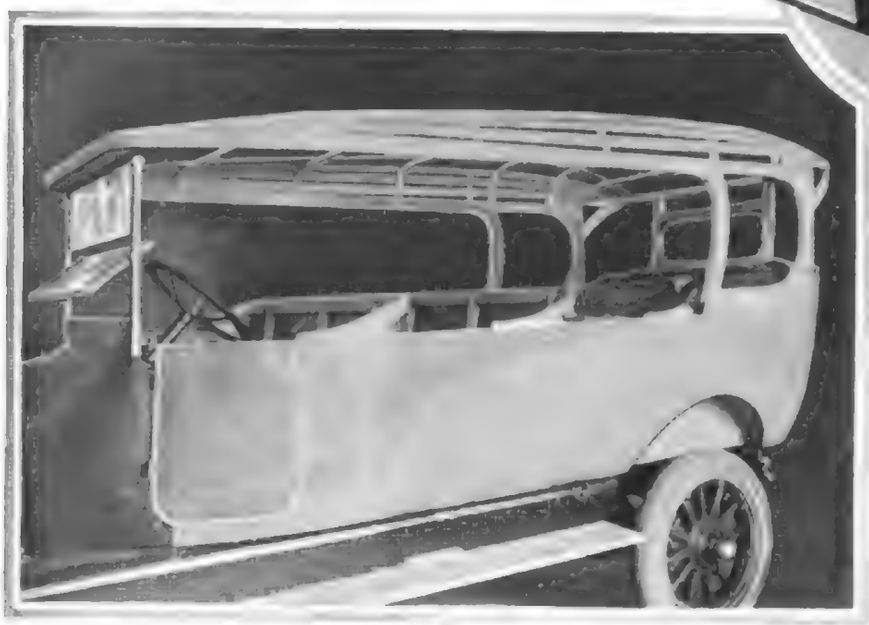
The great variety of solid and Moorish colors and the handsome, leather-like grains of such a material as Craftsman Fabrikoid, making combinations to suit any owner's fancy, were added attractions. Some of the first rigid tops covered with Craftsman Fabrikoid, made by the Du Pont Fabrikoid Co., Wilmington, Del., are still in use in California and in perfect condition. Among the thousands of tailor-made tops in California a great majority are said to be covered with this material, so thoroughly has it proven

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itself there. It is a fact that these tops, known everywhere else as California tops, are frequently spoken of in California as Craftsman tops.

Real vs. Imitation Cane Work

The best known method of applying French imitation cane work consists of pasting the cane work on the surface and then varnishing over it. This material is a sort of papier mache fabric and has for years been manufactured in this country. This class of cane work has not been used to any great extent in recent years, and looks rather cheap when compared with the real French style of cane work put on by hand and perhaps best exemplified by Brewster & Company, of New York. Imitation cane work, moreover, is not as a rule durable, loosening after it has been in use possibly a year or two, while the real article is, of course, permanent.



Frame for Sight Seeing Bus

The cane work applied by Brewster & Company is that used by the best French coach body builders and is laid on with a striping and ornamenting pencil, line upon line, until the desired effect is secured. To put on this cane work by hand, as illustrated by the famous firm above mentioned, involves an expense, per vehicle, of anywhere from $200 to $300, depending on how many panels are done in this manner.

Money Savers for the Body Shop

(Continued from page 30)

ing the shutter guard on the cutter head bearing rather than in grooves.

Many of our readers have felt the need of a bench type portable tool of this character, which they could place at the workman's elbow and thereby do away with all unnecessary walking to and from the big stationary machines. Others have realized the great amount of time and labor that such machines would save through the elimination of costly hand fitting, trimming and jointing. All of these objects would seem to have been obtained in the line of machinery made by J. D. Wallace & Co.

Duratex Company Acquires Two Good Men

The Duratex Company, Newark, N. J., manufacturers of Duratex coated fabrics, announce the appointment of Ralph S. Allen as general manager, with headquarters in Newark, N. J. Mr. Allen was until September associated with the Wagner Electric Company, in the Detroit territory, and is widely known in the automobile and accessory industries.

The Duratex Company has recently opened a Detroit office to provide facilities for handling the steadily increasing demand for Duratex automobile upholstery. The Detroit office is at 720 Book Building, with Earl W. McGookin in charge as sales manager of the automotive division. Mr. McGookin, like Mr. Allen, is well known in the automotive field, and numbers a host of men in the industry as his friends.



Touring Car Frame.
Back Corners Covered with Sheet Steel

Reports that the Lowell Cutter Co., Lowell, Mich., has discontinued making vehicle body work are untrue. This old-established firm is not only still in business, but their plant is fully occupied. They will manufacture wood work as long as a demand lasts.



Bus Top Nearing Completion
ILLUSTRATING CONSTRUCTION OF THE CALIFORNIA TOP. (SEE ARTICLE ON PAGE 49)

Members of the Trailer Manufacturers Association of America held their October meeting in New York, preceded by a meeting of the executive committee. They reported considerable improvement in trade. Purchases have been larger than during the first nine months in previous years, with good prospects of still larger business in the last quarter. H. C. Fruehauf, Detroit, and C. A. Geiger, New York, were made vice-presidents.

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News in the Trade

National Auto Shows to be Greater Than Ever

With a record list of exhibitors the National Automobile Shows to be held in New York and Chicago next winter, under the auspices of the National Automobile Chamber of Commerce, will easily be the greatest in the history of the industry. No less than 87 different makes of passenger cars will be displayed, while 60 makers of trucks have already secured space to exhibit their products. The displays of accessories will be greater than ever before and at least a dozen new makes of cars will be shown for the first time.

The New York show will be held during the week of January 3rd to 10th. Grand Central Palace will be utilized for passenger cars and accessories, while the Eighth Coast Artillery Armory, Kingsbridge Road and 194th Street, will house the motor trucks and sundries.

Truck Show in Separate Building

The location of the Armory may seem to those in the vicinity of 42nd Street and Broadway far away and hard to reach. Such is not the case, for the big structure, the largest armory in the United States, is easy to find and may be reached by subway or elevated within thirty-five minutes from either Times Square or Grand Central Station. Exhibitors can for the first time in the history of motor truck shows secure all the space they need, for the main hall of the armory is 300 x 600 feet and is not obstructed with posts.

A big transportation conference will be held at the armory during the show, at which experts on transportation matters will speak. There will be other features to make the truck show attractive to the general public as well as to those people most vitally interested in the commercial car.

Exhibits of Passenger Cars

The following makes of passenger cars will be exhibited at both the New York and Chicago shows:

Allen, Amalgamated, American Beauty, Anderson, Apperson, Auburn, Biddle, Briscoe, Buick, Cadillac, Case, Chalmers, Chandler, Cole, Chevrolet, Cleveland, Columbia, Comet, Commonwealth, Crow-Elkhart, Davis, Detroit Electric, Dixie Flyer, Dodge Bros., Dorris, Dort, Elcar, Elgin, Essex, Fiat, Franklin, Grant, Haynes, Hollier, Holmes, Hudson, Hupmobile, Jackson, Jordan, King, Kissel Kar, Leach, Lexington, Liberty, McFarlan, Mailohm, Marmon, Maxwell, Mercer, Milburn Electric, Mitchell, Moline-Knight, Monitor, Moon, Nash, National, Oakland, Oldsmobile, Olympian, Overland, Owen-Magnetic, Packard, Paige, Paterson, Peerless, Pierce-Arrow, Premier, Reo, Roamer, Saxon, Savers, Scripps-Booth, Standard Stanley, Stearns-Knight, Stephens Six, Stevens-Duryea, Studebaker, Stutz, Templar, Velie, Westcott, Willys-Knight and Winton.

The Kline Kar will be exhibited at New York only, while the Pilot and Monroe will exhibit at Chicago only.

Exhibits of Commercial Cars

The following makes of motor trucks will be exhibited at both the New York and Chicago shows: Acason, Acme, American, Atterbury, Autocar, Bethlehem, Clydesdale, Defiance, Denby, Diamont T, Dodge Brothers, Dorris, Federal, Fulton, Garford, Indiana, International, Jackson, Kissel, Maccar, Master, Maxwell, Nash, Oldsmobile, Oneida, Overland, Packard, Paige, Pierce-Arrow, Reo, Rowe, Schacht, Selden, Standard, Stewart, Union, Velie, Vim, Walker, Walter and Wilson.

The following makes will exhibit at New York only: Brockway, Commerce, Corbitt, Four Wheel Drive, Kelly, Koehler, Nelson & LeMoon, Rainier, Sanford, Sterling, and Ward.

The following makes will exhibit at Chicago only: All American, Armleder, Dependable, Gramm-Bernstein, Kalamazoo, Obenchain-Boyer and Service.



This Austrian Daimler chassis, imported before the war, has received a new body at the factory of Clara S. Caffrey & Co., Camden, N. J. It is upholstered in straight grain hand buffed leather, Burbank khaki top and canopy. Special lamps were used on this job.

Philadelphia Body Builders Meet

The regular monthly meeting of the Carriage, Wagon and Motor Body Builders' Association of Philadelphia, was held at the Hotel Hanover on Friday evening, October 17th. President Dunbar, through his wholesouled endeavors to advance the association in all possible ways, has won the approbation of every member of the organization. His efforts have met with the co-operation they merit, the result being an increased attendance and a more lively interest in the business and social features of the meetings. Still there are members whose attendance record might be improved. Mr. Dunbar wishes every member will arrange to come to the November meeting.

H. D. Taylor Co. in Good Shape

A fire in the establishment of H. D. Taylor Co., Buffalo, N. Y., manufacturers and importers of motor car fabrics and furnishings, did considerable damage to the main building. However, the stock of automobile trimmings was protected, so that damage to that particular department was very slight. The company is still in good shape to handle orders for automobile and carriage trimmings.

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A PAGE FROM CINCINNATI

Carriage Trade News Notes

The carriage business in Cincinnati is keeping up remarkably well and there seems to be no pause for want of orders which are received daily in large numbers. The question is how the factories are going to take care of this voluminous business and how the situation can be relieved with the present labor shortage.

The export carriage trade is returning rapidly and as several of the Cincinnati factories specialize in that line, suffice it to state they are indeed very busy and their order books are filled.

There is one thing certain, that the labor strikes which at present are so decidedly in vogue throughout this glorious country of ours, are not materially relieving the problems of the carriage manufacturers. Consequently they are suffering for the want of materials of all kinds. Especially is this true with steel and iron, as these commodities are rather distinct factors in the building of a buggy, carriage and wagon.

In times like these, when the country is enjoying the greatest prosperity in history, there should be the spirit of "construction" and this spirit should prevail all around. Let us hope there soon will be relief.

During the early part of last month Cincinnati was the rendezvous of thousands of visitors, all going there to witness the world series base ball games between the "White Sox" of Chicago, who represented the American League, and the Cincinnati team, who represented the National League. Cincinnati won the series and consequently all Cincinnati feels very proud and elated with the distinction.

Business was practically suspended during the games and the carriage manufacturers were out in large numbers, with their friends, enjoying the various games. It is fifty years since Cincinnati could claim the name of "Champions" in the base ball world, so one can well appreciate how the present event pleased all of Cincinnati. The carriage craft as a whole are ardent "fans" and they jollified to their hearts' content.

* * *

The Sayers "Six."

The Sayers & Scovill Co. report that they are increasing production on the "Sayers Six" as rapidly as possible to keep up with the increased demand.

The "Sayers Six" is a five-passenger car of rare beauty and was on exhibition at the local auto show held in Cincinnati in September. The firm also designed a new style light five-passenger sedan and roadster, which were on exhibition, and as the company has a reputation as high class coachbuilders and build their own bodies, the "Sayers Six" has been favorably commented on. In fact, the "Sayers Six" is being talked about and is making a big hit with the trade wherever it is shown.

The Sayers & Scovill Co. are having many dealers visit their factory from all sections of the country. One of the recent visitors at the factory was Joseph Fluxman, of Paris, France, who made arrangements to look after the distribution of the "Sayers Six" cars in Europe.

Cincinnati Carriage Makers' Club

The regular meeting and dinner of the Cincinnati Carriage Makers' Club took place on the evening of October 13th at the Business Men's Club, with an attendance of fifty members and one guest.

At 7 o'clock President Cleu Perrine informed the assemblage that dinner was ready to be served, and under the direction of P. P. Hunter, chairman of the entertainment committee, a very substantial meal awaited all. Hofer's orchestra furnished the music and this surely was very enjoyable.

George Wehrung, of Gunther, Plummer & Wuest, Insurance, and Harry F. Niehaus, of the Victor Rubber Co., were elected to membership.

The speaker of the evening was A. L. Behymer, managing secretary of the Division of Manufactures of the Cincinnati Chamber of Commerce. Mr. Behymer made a rather exhaustive talk along the lines of the proposed constitutional amendment, "classifying property for taxation." He stated in part "that there must be some practical form in classifying property for taxation—both tangible and intangible property—that the present form of taxation fails to meet the expenses of the municipalities; that in Ohio alone the tax duplicate indicates that nine billion of dollars of tangible property is listed for taxation, whereas about fifteen billion dollars worth of intangible property is sequestrated and not listed. Consequently there must be some relief from this state of affairs. Mr. Behymer urgently advised his hearers to support the amendment at the polls.

M. C. Longenecker, of The Ault & Wiborg Co., stated that in fourteen States three-fourths of the taxes were borne by the manufacturers and in seven States sixty-six per cent. is paid by the manufacturers, and that the farmers do not pay the taxes that they should pay.

Otto Heinrichsdorf, the newly-elected president of the Carriage, Harness and Accessory Traveling Salesmen's Association, was present and stated in part "that the C. H. A. T. was a wonderful organization with wonderful possibilities, and a wheel within a wheel, as it co-operates with the C. B. N. A. and is composed of all the live wires of the accessory trades. He advised all non-members to join this excellent organization.

E. V. Overman, general manager of the Standard Parts Co., was called upon for remarks and he stated that the present steel strike was uncalled for, that Judge Gary was the greatest man in the world today, and that all should stand behind him to the last.

Val. Steinle, of the Stewart-Mowry Co., Chicago, varnish makers, and C. J. Rennekamp, of The Auto Vehicle Parts Co., also made some interesting remarks.

At nine o'clock the meeting adjourned to meet again in November.

* * *

Brief News Notes of the Cincinnati Trade

The Anchor Top & Body Co. is working diligently to supply the demands for its winter tops.

* * *

The Edward F. Alf Co. is one of the best known supply houses in this territory and is always busy.

* * *

The Phoenix Carriage Co. is having a most satisfactory business and has plenty of orders on its books.

* * *

Luth Carriage Co. is one of the busy factories of Cincinnati, and is working hard to keep up with orders.

* * *

The Brown Carriage Co. is enjoying a very good trade, and their "Pony" line of vehicles is in great demand.

* * *

The Monarch Carriage Goods Co. is decidedly busy. Henry Voss, the manager, states that business never was better.

* * *

The G. A. Schacht Motor Truck Co. is again making extensive improvements and erecting additions to their present plant.

* * *

E. V. Overman, general manager of the Standard Parts Co., states that his concern is well filled with business all around.

* * *

Emil E. Hess, general manager of the Sayers & Scovill Co., is back at the office again after a two weeks trip to Atlantic City and New York.

* * *

Orders for the Enterprise Brass & Plating Co. are coming in very nicely and this company is making very prompt deliveries to their customers.

* * *

C. J. Rennekamp, of the Auto Vehicle Parts Co., reports that his house is taking care of all the business coming their way, despite the fact that they are swamped with orders.

* * *

Trade with the American Oak Leather Co. is exceptionally good and the genial representative of that concern, John L. Parker, has hosts of friends and enjoys their confidence.

* * *

John A. Creighton, the well-known representative of the Truscon Laboratories, Detroit, is having a very fine trade in this territory on colors and varnishes. Truscon "laboratory quality" is very popular.

* * *

Cincinnati vehicle builders and accessory manufacturers were very well represented at the forty-seventh annual convention and exhibition of the Carriage Builders' National Association in Chicago last month. Several of the accessory and parts manufacturers came away with nice orders obtained at the convention, and all who attended reported their time very well spent in Chicago.

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The Queen City Forging Co. is deluged with business and has recently installed some new equipment to increase the output.

• • •

The Highland Body Mfg. Co. is extremely busy and reports that the demand for truck bodies and cabs is rapidly increasing.

• • •

The United States Electrical Tool Co. is enjoying very good business. United States portable electrical drills and grinders are in big demand.

• • •

Frank Medeweller, proprietor of Ohio Seat Co., reports that trade with his house is very good. The Ohio Seat Co. specializes in buggy bodies and seats.

• • •

The Cincinnati Electrical Tool Co. is toiling hard to supply its customers promptly. This company specializes in portable electrical drills, grinders and reamers.

No Medium-Priced Pierce-Arrow

There have been many rumors of late that the control of the Pierce-Arrow Motor Car Company has been acquired by the General Motors, and that the new interests intended to produce a small, medium-priced car in quantity production.

With reference to these rumors, John C. Jay, Jr., president of the Pierce company, has authorized the following statement:

"The directors and officers of the Pierce-Arrow Motor Car Company have no knowledge of any change in the control of the company, nor of the purchase on the open market of the controlling interest in The Pierce Company's stock by any other automobile company.

There are absolutely no plans in contemplation involving the production of a small, medium-priced car. The Pierce company will continue to build a line of product of the highest quality and type, on which its reputation and success has been established.

New Acme Truck Distributor

The Acme line of 1, 1½, 2, 2½ and 5-ton worm drive motor trucks is now handled on the Pacific coast by the Douglas Boswell Company, 1229 Seventh Street, Sacramento, California. This company is well known on the coast by reason of its connection with the automotive industry in times past. The Douglas Boswell Company has the entire State of California and Nevada as far east as Elko County.

Another Acme connection of more than passing interest to the trade is the Acme Motor Sales Company of Baltimore, Maryland, with E. Comer Smith, president. This company has the entire States of Maryland, Delaware and the District of Columbia.

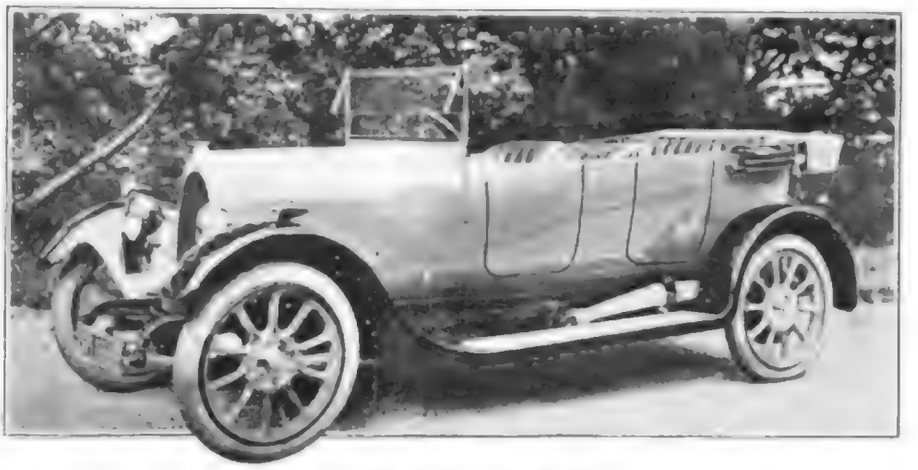
The Horse Publicity Association is the title of a new organization with headquarters in the Hay Exchange Building, New York.

An Old Firm Discontinues

Harper Buggy Co., Columbia City, Ind., have taken over the entire stock of the Mier Carriage and Buggy Co., Ligonier, Ind., and have moved this stock to their Columbia City plant. The Mier concern has discontinued the manufacture of vehicles.

Trailmobile Co's New Factory

Construction work on the new factory of the Trailmobile Co. in Cincinnati is progressing rapidly and the company believes it will be the finest exclusive trailer plant anywhere. The first unit will be 200 by 500 feet. The company recently made exhibits of its trailers at the California, Texas and Ohio State fairs and had a display in the Cincinnati automobile show the week of September 13-22.



THE PRINCE OF WALES' NEW CAR.
A Victory Model Arrol-Johnston supplied by Messrs. Leverett, Thorp & Kearton, Ltd., London. It has a four-cylinder engine. The body follows the prevailing fashion of straight lines, and flush sides with paneling turned over. It is a workmanlike production with plenty of engine power, and weighing all on, only 2,500 pounds. Its total cost is $6,500.



LIVESTOCK BODY ON FORD CHASSIS.
Built by Hercules Buggy Co., Evansville, Ind.

The G. E. Blaylock Tire & Rubber Co., 1811 North Charles Street, Baltimore, has been incorporated with $750,000 capital stock and plans are being made to build a factory.

The Reliance Motor Truck Co., Appleton, Wis., has plans for a four-story addition, 70 x 300 feet, and will soon be in the market for a considerable list of new tools for manufacturing complete motor trucks and external spur-gear drive rear axles for trucks.

The Reus Brothers Co., 146 Mount Royal Avenue, Brooklyn, will build a plant, 75 x 250 feet, for the manufacture of automobile and airplane parts and piston rings, with a daily capacity of 10,000 rings. About 1,500 men will be employed.

The Buffalo Truck & Tractor Co., Liberty Bank Building, Buffalo, has made arrangements with the Buffalo Pitts Co. for the manufacture of its combination truck tractor and power plant for the remainder of the current season. Later on it will establish its own manufacturing plant.

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The "Perfect" Window Regulator

It is now more than ten years since the "Perfect" Window Regulator was first introduced to American body builders. At that time there were few devices of this kind on the market, and none of those then existing gave satisfaction, either to the body builders or the people who bought the cars.

The principles upon which the "Perfect" was designed were at once recognized as correct and a very distinct advance upon any of its predecessors. Naturally, in a very large proportion of the body shops, the evident superiority of the new window regulator forced its instant adoption.

Approved as it was by the leading body engineers and designers, many of the "lesser lights" in the body building trade, to a great extent, have also adopted the "Perfect" window regulator for all their closed jobs.

This particular window regulator has made such headway in the trade that a checking up of the well-known cars would show that among the better grade closed bodies the "Perfect" regulator can be considered a standardized part. Custom builders, however, were among the first to recognize the advantages of this type of regulator, which of course is as well adapted for the finest custom built job as for a factory production. Nothing more refined or more neat in the way of a window regulator has yet appeared, and as neatness and refinement are two of the objects striven for in a made-to-order car, the "Perfect" window regulator exactly meets the requirements.

This regulator automatically locks the glass at any desired height. It is absolutely noiseless—no rattle. It is very easy to install. In fact it requires no more ability to install these regulators than it did to place in position the window operated by the old-fashioned straps. The illustrations show a door, with regulator installed and ready for trimming, and a completely trimmed door, showing the finished effect. The Perfect Window Regulator Co., 20 Exchange Place, New York City, are the sole manufacturers of this important article of motor car equipment.



Completely Trimmed Door, Showing the Finished Effect.



Door, with Regulator Installed, Ready for Trimming

THE "PERFECT" WINDOW REGULATOR.

Brown Carriage Co's New Catalogs

The Brown Carriage Co., wholesale manufacturers of horse-drawn spring vehicles, Cincinnati, are about to issue two new catalogs. One of these catalogs will illustrate and describe the Brown line of full-sized buggies and the other the unique line of Brown pony vehicles. This company is perhaps the principal source of supply for pony vehicles, which come in many beautiful designs, for one or several passengers.

This company reports that the year's business just closing has been very satisfactory, as they have shipped an unusual number of both full and pony-sized vehicles. This was done notwithstanding difficulty experienced throughout the year in getting certain materials. The company is already arranging to take care of even a larger volume of business for 1920.

The Remedy for High Living Costs

(Continued from page 10)

On American business rests a grave responsibility for efficient co-operation in bringing about full and proportionate production. On American labor rests an equally grave responsibility to attain maximum unit production and maintain uninterrupted distribution of goods if labor itself is not to suffer from further rises in the cost of living.

The entire nation—producer, distributor and consumer alike—should return to the unity that won the war. Group interest and undue personal gain must give way to the good of the whole nation if the situation is to be squarely met.

Our common duty now fully as much as in the war, is to work and to save. In the words of the President in his address to the country on August 25, 1919: "Only by increasing production, and by rigid economy and saving on the part of the people, can we hope for large decreases in the burdensome cost of living which now weighs us down."

Varnish Room Temperature

(Continued from page 42)

of the ceiling, or preferably through the ceiling, if fetched in at a good volume, is from any point of reasoning the best to be had. The heat, if it could be so furnished, should be on the hot water plan. Next to this is steam heat, which is more difficult to maintain unless managed by an experienced caretaker.

The temperature of the varnish room is a disputed question, even among experts. A temperature of 75 degrees is a fair adjustment of the issue and if maintained at this degree all will be well, provided other things are equal.

To help the temperature in its difficult work the room should first be clean—clean as a washed platter, as the lady at my right would say.

Then it should have a flood of light at the time when light is most needed, which is at the moment of applying varnish and, following a few hours after, permitting it to set in a dark room to touch off the brilliancy of the varnish. Light, along with a uniform temperature, at all times serves to heighten the lustre of the varnish and aids it to harden and mature.

To the varnisher, experienced or inexperienced, we would say, watch the temperature. Keep it uniform and thereby provide against accidents and irregularities. Increase the efficiency of the varnish room; make it the best paying department of the business.

Indianapolis Body Corporation

The Indianapolis Body Corporation, Indianapolis, recently organized with a capital stock of $150,000, has bought the former plant of the Overland Automobile Co., at Oliver Avenue and White River Boulevard. The main building is 90 x 400 feet, and the floor space, including two other buildings, is 225,000 square feet.

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If it "*looks*" like leather
If it "*feels*" like leather
If it "*wears*" like leather

It is COTEX

The Dependable

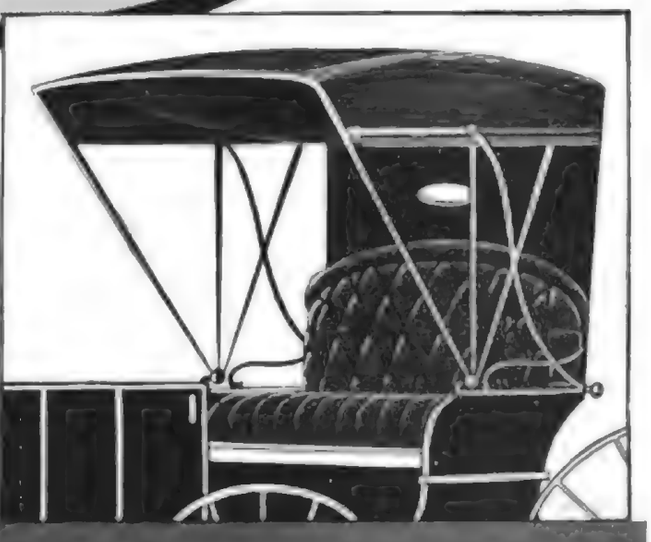
LEATHER CLOTH

Made in a variety of

Weights
Colors
Grains

Write for Samples





The COTEX Company
Sales Office
366 Fifth Ave. NEW YORK
Factory
337-343 Oliver St. NEWARK, N. J.

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Rubbing Varnish at its Best

(Continued from page 41)

For the first coat of rubbiug varnish it is wise to have a separate set of varnish brushes. Keep these in a separate keeper in the same kind and make of varnish that you are using the brushes in. This will make it necessary to change the varnish often, to be sure, but it will give you a set of brushes always dependable. This possibly thickened varnish may be used upon parts of the car not showing much or for use in pigments which require a quantity of varnish for binding purposes.

The brushes used upon the other coats of varnish may be kept in varnish from which the dryers have been removed or to which they have not been added, and this will afford a preserving medium of the best sort, and is the same that is usually employed by the finisher for preserving his tools.

For the first coats of varnish a flat, half-elastic, white bristle brush will be found the good flowing tool, with a bear's hair or fitch brush to pick up. Make the size of this brush to conform to the size of the surface—two-and-a-half or three inch, as the case may be. Perhaps this same style and width of brushes may suffice for the flowing of the other coats of varnish.

Make a selection of the best brushes for this class of varnishing—speaking now of car body work. Give them the best care at command; keep them clean in air-tight keepers. Make every available lick of care and skill count for the production of rubbing varnish at its best.

Firestone's Big Stock Issue

The Firestone Tire and Rubber Co., Akron, Ohio, is offering, through the National City Bank of New York, $10,000,000 worth of seven per cent. cumulative preferred stock, par value $100 per share. This stock is part of an authorized issue of $40,000,000, the creation of which has been sanctioned by the stockholders of the company in order to provide funds for further development.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (8 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

AUTOMOBILE TRIMMER WANTED.—We have an exceptional opportunity to offer a first-class all-around man. Steady position and a fine opportunity for advancement. Good wages. Address "640," care THE VEHICLE MONTHLY, Philadelphia, Pa.

FOR SALE.—White oak wagon poles, 3 x 6 in. butt, 3 x 3 in. point, 12 ft. lengths. F. F. BOWN MFG. HOUSE, Box 500, Pittsburgh, Pa.

WANTED.—A live salesman to sell truck bodies in Western territory which have many patented features. Liberal commission. Address all communications to THE BERGSTROM-BREWSTER COMPANY, Denver, Colo.

WANTED. A first-class paint tester, to take charge of that character of work in a large paint concern. First-class salary paid to the right man. Address, giving experience, references, etc., "560," care THE VEHICLE MONTHLY, Philadelphia.

WANTED. A paint mixer, one thoroughly experienced. First-class salary paid to the right man. State experience, references, etc. Address "565," care THE VEHICLE MONTHLY, Philadelphia.

WANTED. Automobile body draftsmen. Men thoroughly experienced on working drawings and custom work. Permanent position. State age, experience and salary expected in first letter. All applications held in strict confidence. Address "615," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—Position as assistant manager or assistant to superintendent in automobile custom shop; 15 years' experience. Can give best of reference. Address "620," care THE VEHICLE MONTHLY, Philadelphia.

TRIMMERS wanted (2), custom shop. Address W. M. SCHILLING, 615-617 Second St., N. E., Canton, Ohio.

WANTED.—Superintendent for commercial auto body plant, located in the East, having modern equipment and buildings, and manufacturing all types of bodies including steel coal bodies. State experience and salary expected. Address "625," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—Experienced top builder able to draft automobile tops. Must have good appearance and education. Opportunity to work into selling end. Would have to travel some. Give age and experience. Splendid future for right man. Address "630," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—Foreman painter in custom body plant in one of the largest cities in the Middle West. Must be familiar with the latest painting methods and capable of directing his men in the highest standards of workmanship. Candidates preferred who have had experience in handling workmen. An excellent position for the right applicant. Replies will be treated in confidence. Address "635," care THE VEHICLE MONTHLY, Philadelphia.



The PERFECT Window Regulator

¶ Ten years of successful operation.

¶ Approved by leading body engineers and designers.

¶ Standard equipment on leading cars.

¶ Automatically locks glass at any height

¶ Easy to install.

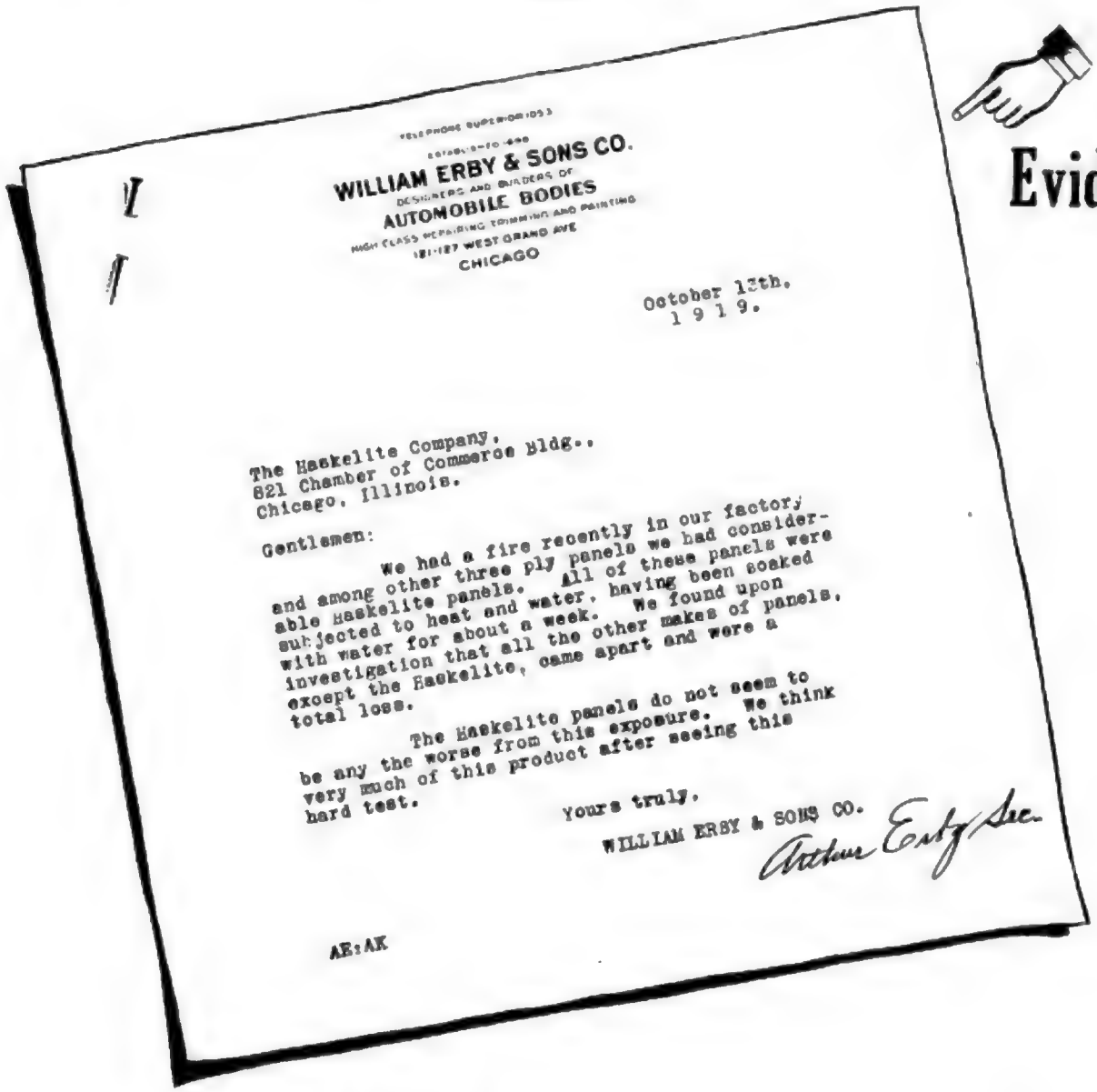
Let us send you complete details of construction

PERFECT WINDOW REGULATOR CO.
20 EXCHANGE PLACE
NEW YORK



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HASKELITE *IS* WATERPROOF



WILLIAM ERBY & SONS CO.
DESIGNERS AND BUILDERS OF
AUTOMOBILE BODIES
HIGH CLASS REPAIRING TRIMMING AND PAINTING
121-127 WEST GRAND AVE
CHICAGO

October 12th.
1 9 1 9.

The Haskelite Company,
821 Chamber of Commerce Bldg.,
Chicago, Illinois.

Gentlemen:

We had a fire recently in our factory and among other three ply panels we had considerable Haskelite panels. All of these panels were subjected to heat and water, having been soaked with water for about a week. We found upon investigation that all the other makes of panels, except the Haskelite, came apart and were a total loss.

The Haskelite panels do not seem to be any the worse from this exposure. We think very much of this product after seeing this hard test.

Yours truly,
WILLIAM ERBY & SONS CO.
Arthur Erby Sec.

AE:AK

More Evidence

HASKELITE MFG. CORPORATION

Chamber of Commerce Bldg.
CHICAGO

GEORGE R. MEYERCORD, President

Factories { Grand Rapids, Mich.
Ludington, Mich.

The Waterproof Mouldable Plywood

Capacity 30,000,000 ft. per year

HASKELITE

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THE DECIDING FACTOR

"I'll take the one that has Firestone Tires."

This is often the way—when it's hard to decide which vehicle to take, Firestone Tires turn the sale.

Firestone satisfies your most exacting trade because Firestone rubber is rightly prepared, and the ample size of the tire gives easy riding with long wear.

Investigate. Let us explain the value of Firestone Tires to your trade and to you.

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK, AKRON, OHIO

Firestone
CARRIAGE TIRES

ILLINOIS IRON & BOLT CO.

Manufacturers of

HIGH GRADE

Steel Axles and Wagon Castings

Ball Bearing Trailer Axles with Interchangeable Sarven and Artillery Hubs

Write for Particulars

ILLINOIS IRON & BOLT CO.
CARPENTERSVILLE, ILL.

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Get This Truck's Record Is All We Ask

We honestly believe that no business house, in its own interest, can afford to buy any truck without fully informing itself about the Gramm-Bernstein.

It should know, for example, that their exists a distinct preference for this truck among experienced buyers.

It should know, also, that this preference—which by the way, is enjoying a very healthy growth—is a perfectly logical development. It should know that Gramm-Bernstein owners are genuinely satisfied.

Our owners will testify that a Gramm-Bernstein lasts literally for years.

That operating upkeep and repair costs are extraordinarily low—and especially so in ratio to the service the truck renders.

And that when they need another truck, or more trucks, their choice is invariably the Gramm-Bernstein.

Gramm-Bernstein engineering finds its latest expression in our new 5-ton truck, which has already had a test equalling two years' ordinary travel of a 5-ton vehicle.

We ask no business to buy our trucks on our say-so—though that is a perfectly safe thing to do.

Gramm-Bernstein performance and service are matters of record. Any one of our dealers will place the facts before you, and put you in touch with our owners.

The most we ask is that you get the complete information.

Gramm-Bernstein Worm-Drive Trucks, in in 1½, 2, 2½, 3½ and 5-ton capacities, are now sold completely equipped, ready for the body—not an extra to buy.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Patent Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194994.

The Gramm-Bernstein Motor Truck Co.

Pioneers Since 1901 – Builders of the First Liberty (U.S.A.) Truck

Lima, Ohio, U. S. A.



FOR any type of work, on trucks of any size or weight, Kelly Caterpillars give the greatest traction and save the truck to the greatest extent.

They deliver the engine's full power to the road. They decrease gasoline consumption and absorb road shocks.

They are easy on the truck and easy on the driver. And they are guaranteed for 15,000 miles.

Kelly-Springfield Tire Co.

General Sales Dept.

4614 Prospect Ave., Cleveland, Ohio

KELLY SPRINGFIELD TRUCK TIRES

CATERPILLAR TREAD

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Size—The Only Difference

EMPIRE Bolts and Nuts are made in many sizes and many styles.

But there the variation stops.

However tiny or however huge, an Empire Bolt or Nut shows the same qualities of strength, accuracy and finish that have carried the name of Russell, Burdsall & Ward into every industrial center in the world—and kept it there during 74 long years of unchallenged leadership.



To specify Empire Bolts and Nuts is to remove every element of chance in an important item of assembly.

The company operates three great plants—at Port Chester, Pemberwick and Rock Falls—with an equipment of bolt and nut making machinery having no duplicate in the industry.

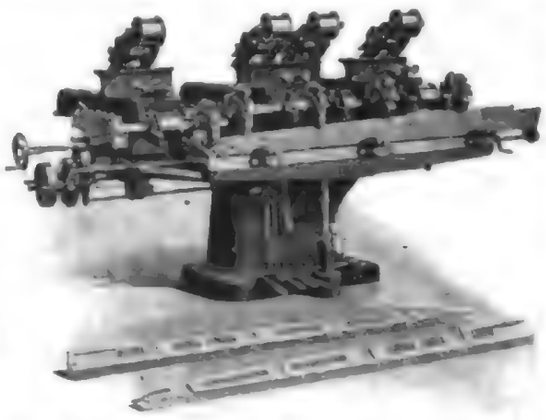
RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY

PEMBERWICK, CONN. PORT CHESTER, NEW YORK ROCK FALLS, ILLINOIS

Makers of Bolts, Nuts and Rivets Since 1818

DEFIANCE

IMPROVED PRODUCTION AUTO-BODY MACHINERY



No. 401 Patent Automobile Body Sill Gaining Machine

Is indispensable to body builders requiring a large output of wooden sections of automobile bodies at low cost. It consists of combination and single purpose machines, designed especially for various gaining operations, sill shaping, saw tenoning and grooving operations, door shaping, etc. Each of these operations is accomplished by *DEFIANCE MACHINES* at a high rate of production, and with a minimum material wastage. Write for illustrated and descriptive circulars.

Designers and Builders of Special Woodworking Machinery

THE DEFIANCE MACHINE WORKS

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ALUMINUM COMPANY of AMERICA

General Sales Office, 2400 Oliver Building

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Producers of Aluminum

Manufacturers of Electrical Conductors

For Industrial, Railway and Commercial Power Distribution

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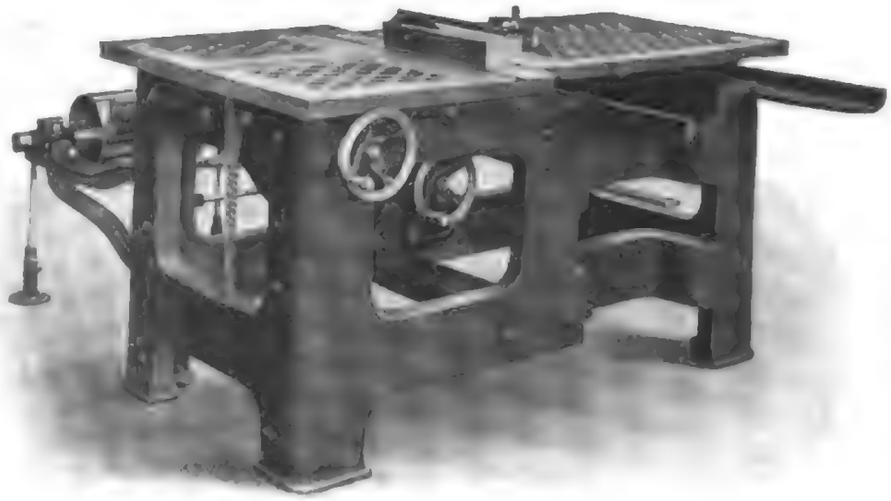
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Improved Bevel and Mitre Saw



In these days of essentials and intense speeding up of manufacturing, we must overlook nothing that will add to efficiency.

This Bevel and Mitre Saw is essential in putting your mill on a high speed basis.

Furnished in two sizes

Write for further information and specifications applying to these saws

PETTINGELL MACHINE COMPANY

AMESBURY, MASSACHUSETTS

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OF GUARANTEED ACCURACY

For Automobiles, Motor Trucks and Special Work

We also make a large line of Drop Forged Carriage and Wagon Hardware

OUR MOTTO:
HIGH GRADE WORK AND PROMPT SERVICE

Send your Models or Blue Prints for Quotations
Write for our Latest Catalogs

RICHARD ECCLES COMPANY

FOUNDED 1880

AUBURN, NEW YORK



Hand Hoist for Ford Truck

(Patents Pending)

TAKES no room back of cab, is easy of operation, simple and neat in appearance.

Shipped on sub-frame, ready for mounting on chassis. Easiest for the body builder to install and best -- because it always makes a satisfied customer.

Write for photos and blueprints.

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CLEVELAND, OHIO

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Registered in U. S. A. and Foreign Countries

ROTARY SHEARS

MADE IN 7 SIZES

Cut All the Sheet Metal Parts for Automobiles and General Sheet Metal Work



SAVES

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QUICKWORK ROTARY SHEARS are used all over this and foreign countries by the largest manufacturers of Automobile Sheet Metal Parts

WRITE FOR CATALOGUE No. 60

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Cable Address: "QUICKWORK"—Codes: W. U. and GENERAL

Trailmobile

Trade-Mark Reg. U. S. Patent Office

The Motorless Motor Truck

Thousands in Use

SIZES
1,250 lbs.
1,500 lbs.
2,000 lbs.
3,000 lbs.
7,000 lbs.
10,000 lbs.
Also semi-trailers

Bodies for every business.

More Profit and a Bigger Market

THERE is danger in having all your eggs in one basket—as recent conditions have shown. To wise dealers in automotive lines who are seeking a broader foundation for their business, more diversity in the products they sell, and a bigger market to sell in—we suggest the Trailmobile.

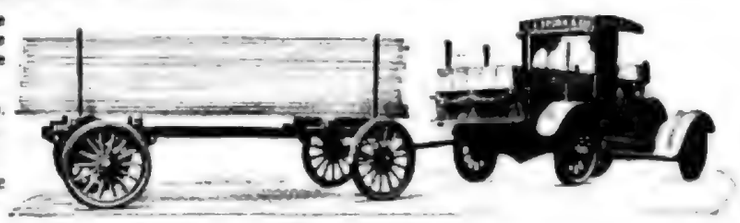
It offers a profit margin equal to that on the most sought-for passenger cars and trucks. It can be sold to almost any truck owner, and to many passenger car owners who have hauling to do. It sells easily because it cuts hauling cost from 10% to 60%—and volumes of testimony prove it. Large companies buy Trailmobiles in quantity.

A big nation-wide advertising campaign, and strong direct-by-mail work on dealers' prospects, help you to find and land business and make money.

Where Trailmobiles are not now represented we want live men. Write for the facts.

The Trailmobile Co.
574 E. Fifth St.
Cincinnati - Ohio

Contractors to the U. S. Government



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When Springs Break

put on

VULCAN

QUALITY

The Replacement Spring



The VULCAN Name-plate
insures absolute protection to the dealer.

When you sell a replacement spring bearing the round VULCAN name-plate you know that spring has been made right and will give complete satisfaction. It protects your future business and your profits.



Unscrupulous jobbers have substituted inferior springs for VULCANS, in the past. We want every dealer to realize that the VULCAN name-plate is his assurance of real VULCAN quality and VULCAN profits, which are high. Look for the name-plate on every spring; when you find it you know you're right.

The VULCAN name-plate is a symbol of Protection and Profit to every dealer.

Jenkins VULCAN Spring Co.

Factory

RICHMOND, INDIANA

Branches

Atlanta, Ga. Kansas City, Mo. St. Louis, Mo.
Boston, Mass. Minneapolis, Minn.
Dallas, Tex. Reading, Pa.

Get our FREE Service Sign and Display Rack with first order.



TRADE S.W. MARK

Specialties in Steel

Suggestion No. 4—As this series progresses there is one thought carried uppermost in the minds of manufacturing concerns who read it, that is when special products of steel are needed, this organization can make it in quantities and at the right price.

The illustration shows a gasoline tank cap of practical construction—made from deep drawing steel (which is much lighter than castings) in specified sizes.

As shown, the handle is very easy to turn, also closing snugly to prevent the gasoline from splashing.

Let this suggestion stimulate your suggestion to Dept. V. M. 4.

Special Productions Department

THE STANLEY WORKS

NEW BRITAIN, CONN.

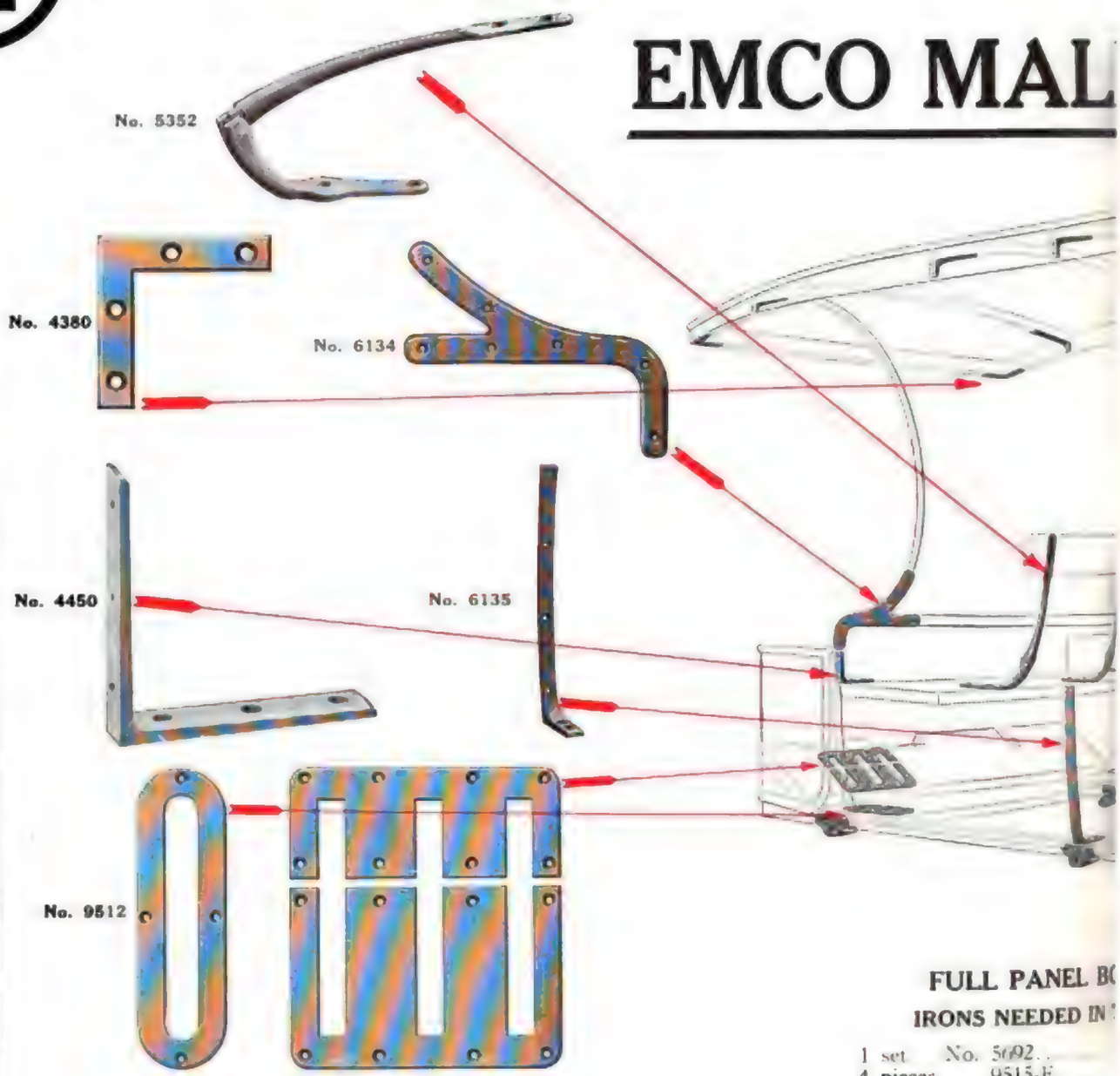
New York 100 Lafayette St. Chicago 73 East Lake St.



"Specialists in Wrought Steel Specialties"

Our war contracts ranged from Curry Combs to Butt Sockets. Ask Uncle Sam about our work

EMCO MAL



FULL PANEL BO

IRONS NEEDED IN

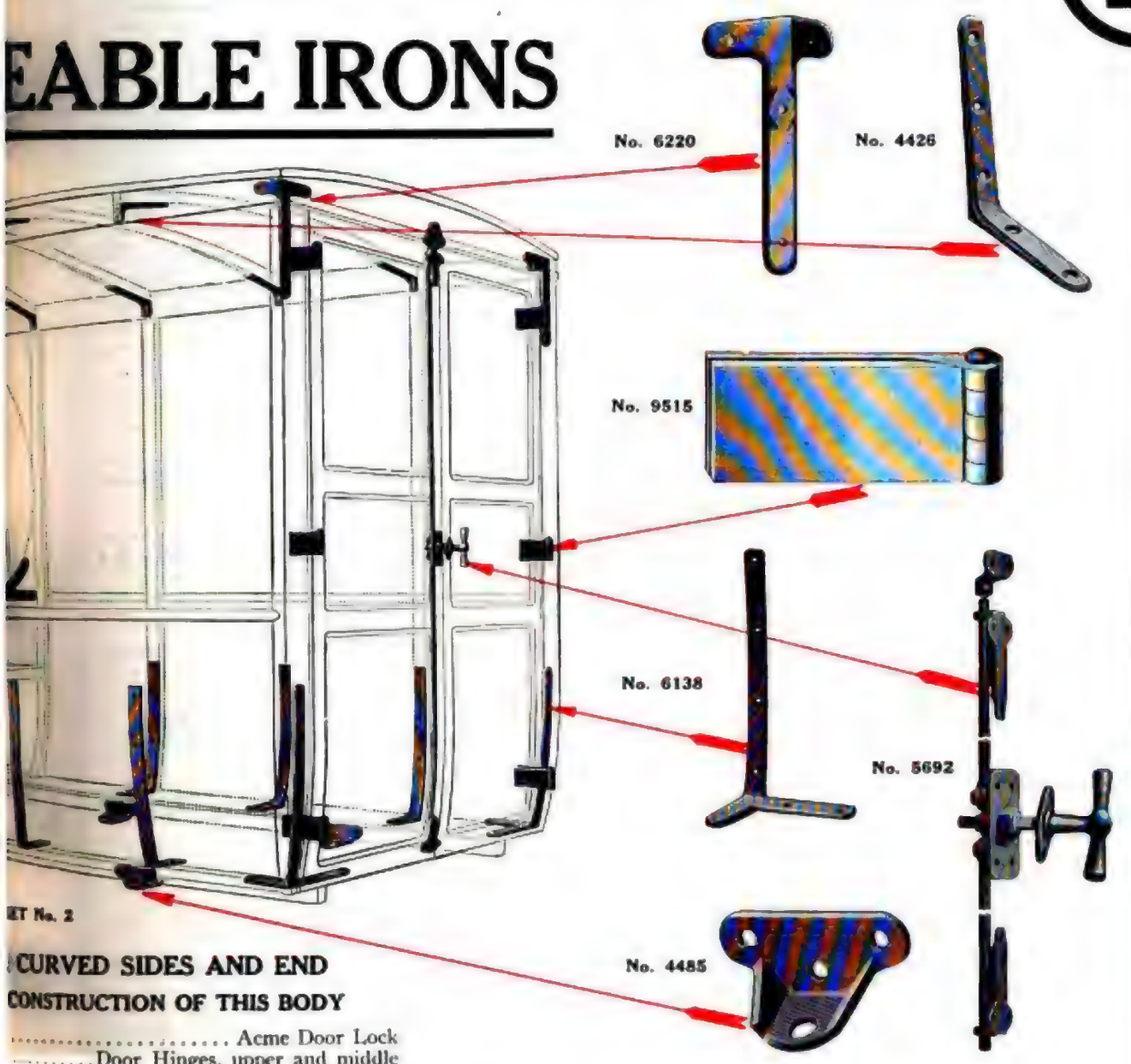
1 set	No.	5692..
4 pieces		9515-E..
2 pieces		9515-H..
1 pair		6138.....
6 pieces		6135-C..
8 pieces		4426-D.
1 pair		6134....
1 pair		6220-B.
2 pieces		4380-B..
2 pieces		4450-A..
1 pair		5352...
1 set		9512..
6 pieces		4485..

WRITE FOR OUR BULLETIN

"ASSEMBLIES OF IRONS"

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EABLE IRONS



ET No. 2

CURVED SIDES AND END
CONSTRUCTION OF THIS BODY

..... Acme Door Lock
.....Door Hinges, upper and middle
..... Door Hinges, lower
....Rear Post, Inside Body Braces
....Side Post, Inside Body Braces
.....Roof Rail Corner Irons
.....Front Arch Stay Braces
.Rear Post, Top Rail Corner Irons
.....Top Rail Corner Plates, front
.....Seat and Body Corner Irons
.....Jointed Lazy Back Irons
.....Foot Board Plates
. .Body and Chassis Connections

THE EBERHARD MANUFACTURING COMPANY CLEVELAND, U.S.A.

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"SEARS-CROSS LOCK" FOR AUTOMOBILE DOORS

"The Lock with the Expanding Latch"

(Manufactured under the Ottinger Patents)



LOCK No. 1200

This is the only FOOLPROOF ANTI-RATTLE LOCK on the market.

The Latch Bolt of the "SEARS-CROSS LOCK" is identical to the ordinary latch bolt, both as to its general appearance and automatic action, *with the exception* that it incorporates the expanding feature consisting of a simple rocker which cannot get out of order.

It perfects the action of the latch bolt in that it completely takes up the clearance which is necessary for the ordinary latch bolt to enter behind the striker, and *holds the door absolutely tight* instead of merely loosely latching it and depending on rubber bumpers to tighten the door.

Another feature of the "SEARS-CROSS LOCK" is that the lock handles cannot rattle.

The most perfect and highest grade door lock in use today. Has been adopted as standard equipment by a great many motor car manufacturers and body builders.

Made for all priced cars, open and enclosed bodies

SEARS-CROSS COMPANY, Bush Terminal, BROOKLYN, N. Y.



Wherever the smoothly gliding car of elegant distinction is seen—there too are

SOSS INVISIBLE HINGES

Refinement of body design depends upon beauty of line. The unbroken beauty of line requires Soss Hinges.

Soss Hinges are mechanically accurate. They insure

Flush Doors, Clean Lines, No Projections

Catalog "B" and discounts on application.

SOSS MANUFACTURING Co

GRAND AVE & BERGEN ST BROOKLYN, N.Y.

Franklin Photo-Engraving House

quality engravings for the adornment and illustration of printed matter, business literature, catalogs, booklets, etc., etc. : :

632 CHESTNUT STREET

PHILADELPHIA

FLEXIBLE BORING MACHINE

PERFECTED



Prices and particulars sent on application.

Bores holes at any angle within a circle of twenty feet or more. USES A FLAT BELT. Has bearings of friction pulley covered, thus overcoming every objection made to the old machine, of which there are thousands in daily use.

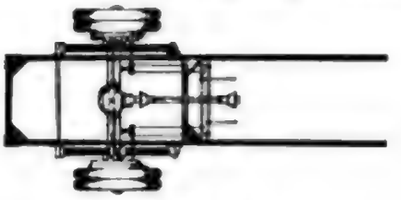
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Chicago Office, 106 S. Jefferson St.

General European Agents
SELSON ENGINEERING CO.
50 Queen Victoria St., London, Eng.

LUVERNE TRUCKGEARS

For Converting Cars Into Motor Trucks



SIZES FROM ONE TO FIVE TONS
Ask for Price List K

LUVERNE AUTO CO. :: Luverne, Minn.



Eagle "Mikado" Pencil No. 174



Regular Length, 7 Inches

Use **No. 314 "Eagle Draughting"** in your Draughting Department.
Use **"Eagle 174"** Nos. 1 and 2 in your office.

For sale at your dealer, 5c each. Made in 5 grades. Conceded to be the finest pencil made for general use.

EAGLE PENCIL COMPANY New York

The HOTEL TULLER DETROIT MICH.



Park, Adams and Bagley

Facing Grand Circus Park

CAFETERIA PAR EXCELLENCE—Self Service

MEN'S GRILL
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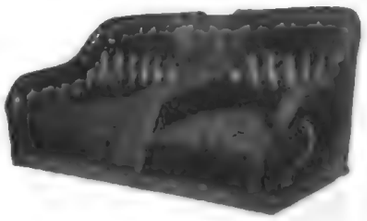
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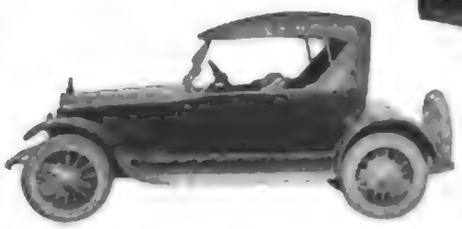
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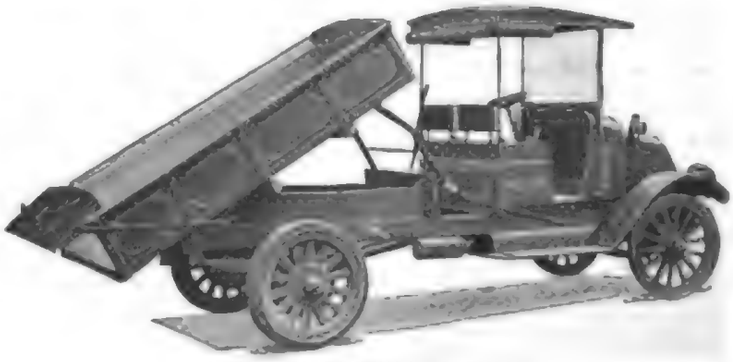
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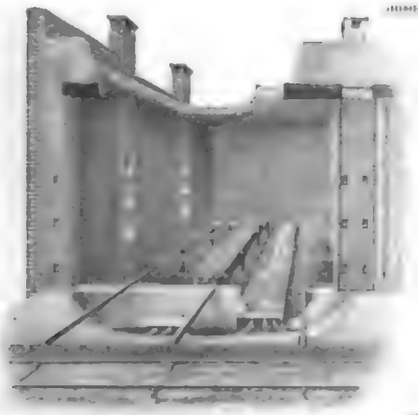
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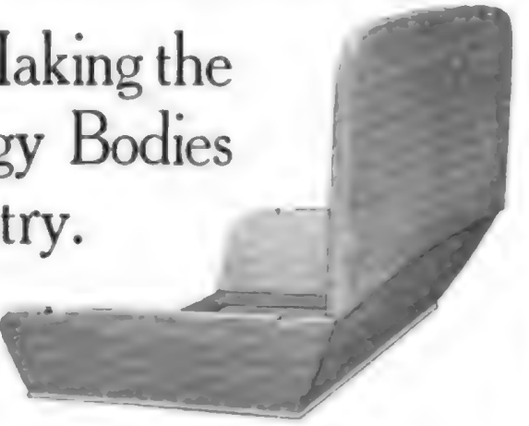
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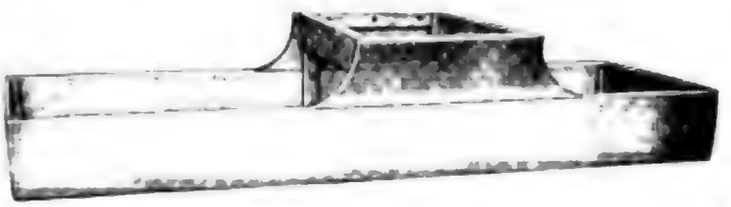
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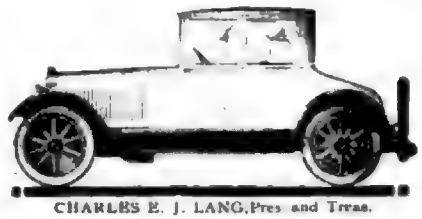
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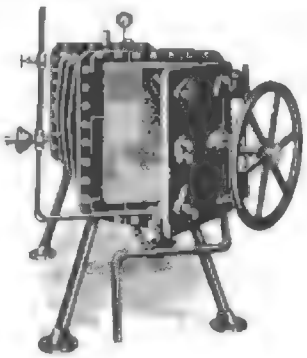


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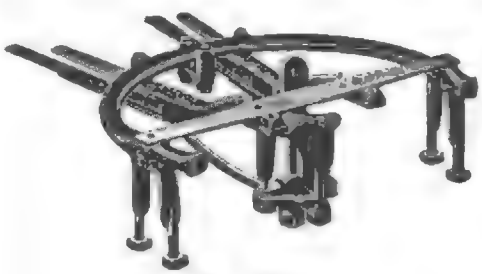
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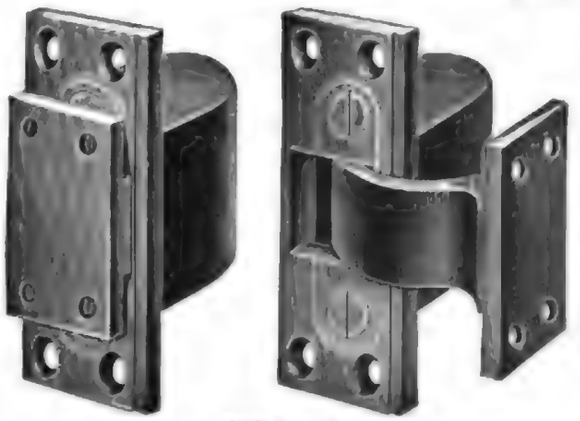
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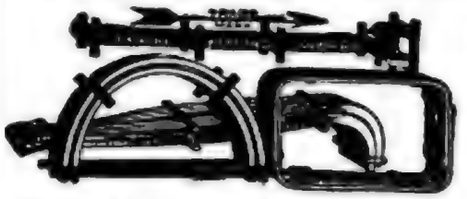


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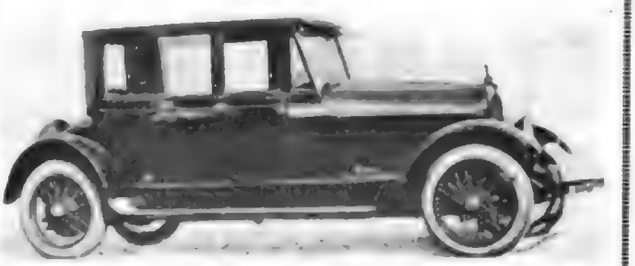
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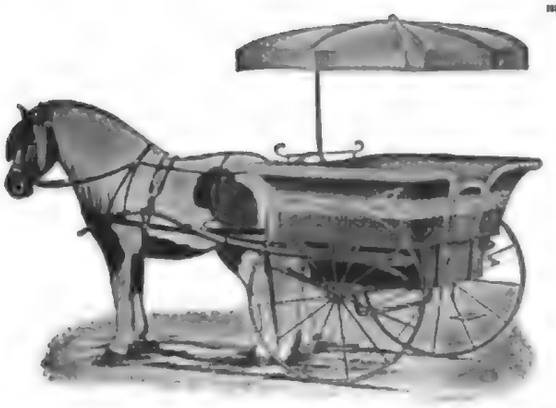
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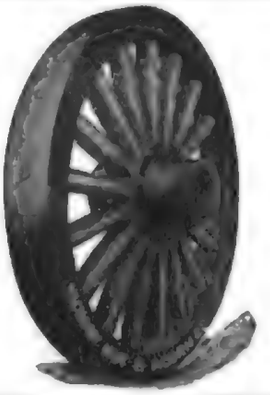
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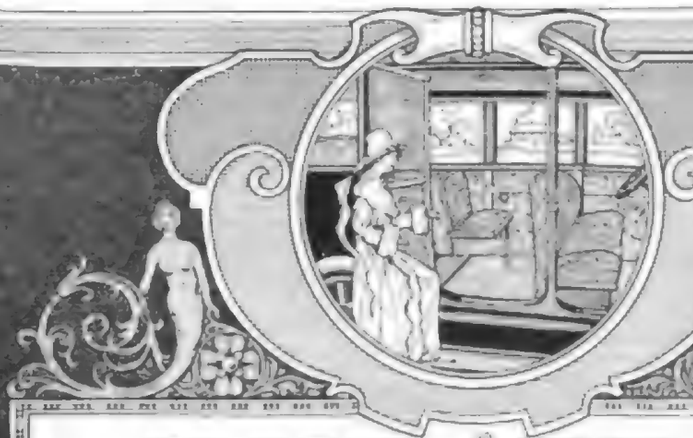
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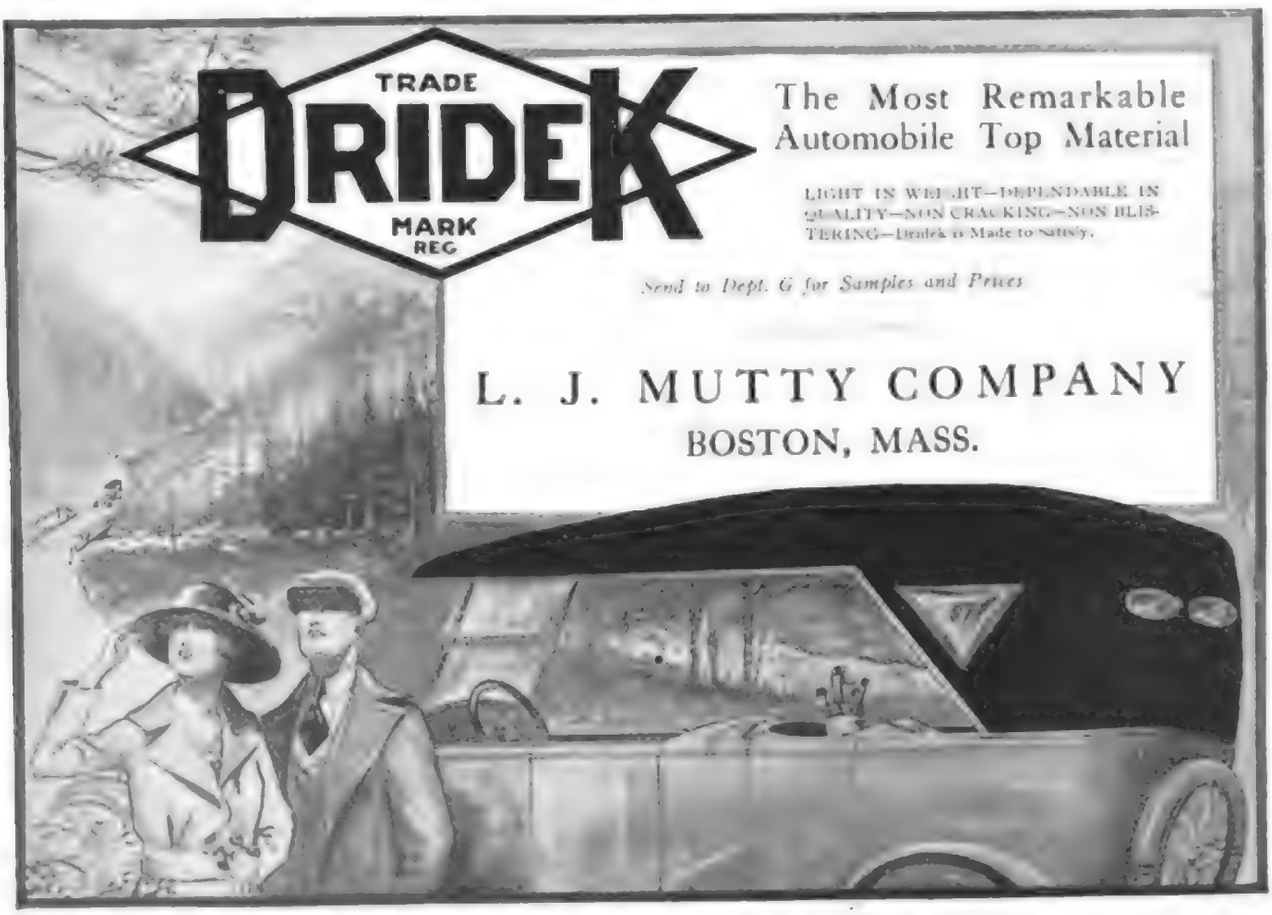
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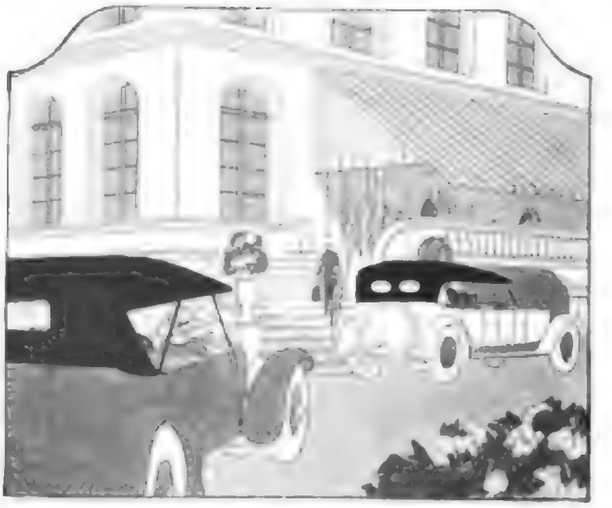
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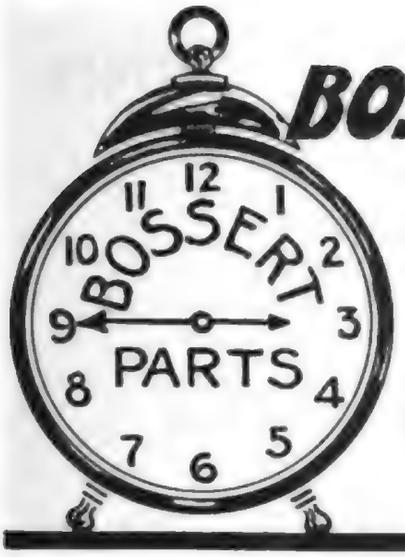
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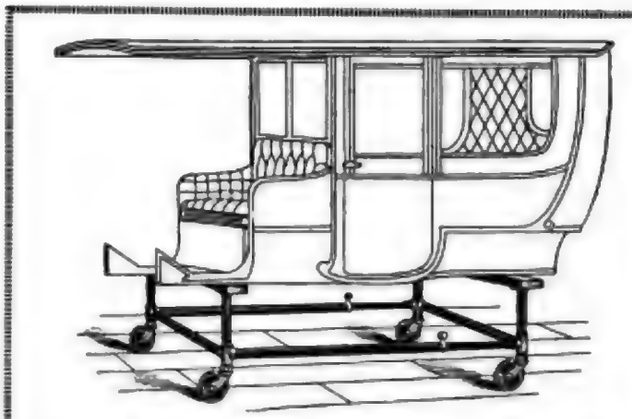
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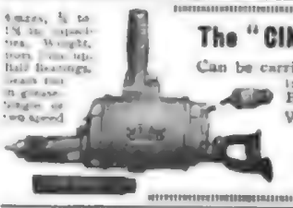
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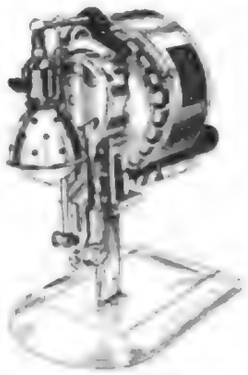
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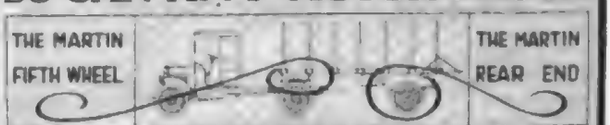
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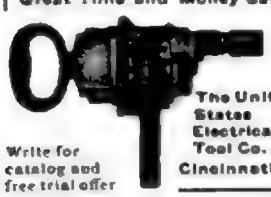
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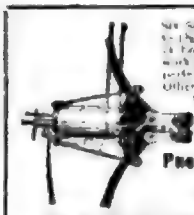
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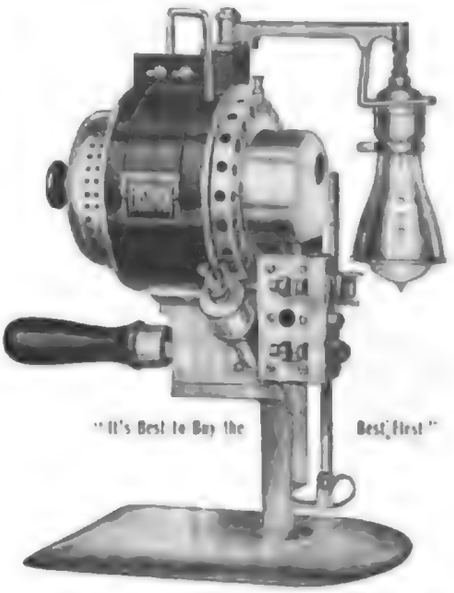
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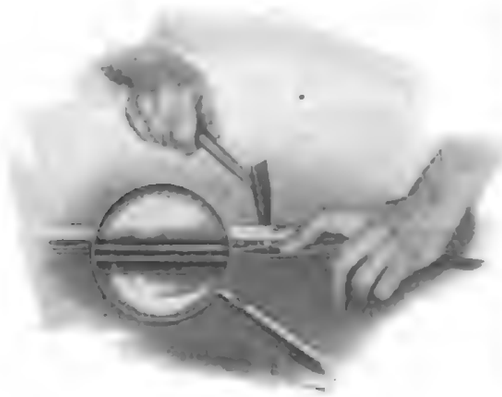
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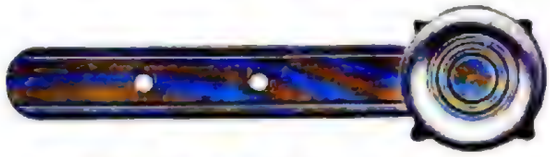
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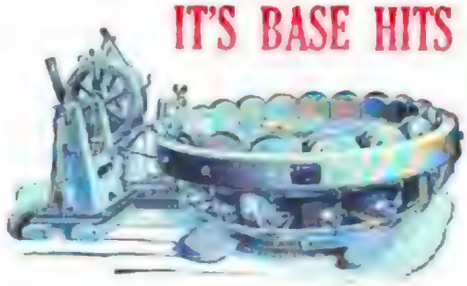
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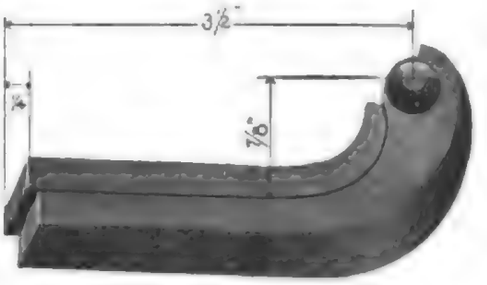
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THE VEHICLE MONTHLY is a member of the A. B. C.

Vol. 55, No. 9 PHILADELPHIA, DECEMBER, 1919 Subscription Price $2.00 Per Year

Plans for Manufactures Census

Special effort is being put forth to make the manufactures section of the approaching Fourteenth Decennial Census the most complete and comprehensive inventory of the nation's manufacturing establishments ever taken, according to officials of the Bureau of the Census who have this work in charge.

The schedules which will be used in tabulating the information about the country's industrial resources have already been prepared and printed. These schedules will be mailed to every manufacturing establishment in the United States during the month of December so that factory owners and managers can familiarize themselves in advance with the questions to be answered when the records of the past year's business have been compiled. The questions relate to the calendar year 1919.

300,000 American Manufacturers

In 1914, the year the last manufactures census was taken, about 275,000 manufacturing establishments were listed by the Census Bureau. This time more than 300,000 establishments will be sent schedules. In addition to this it is expected that about 50,000 mines and quarries will also be reported.

The inquiries relating to manufactures, as specified by the Act of Congress providing for the Census, include the name and location of each manufacturing establishment; character of organization, whether individual, corporate or other form; character of business or kind of goods manufactured; amount of capital actually invested; number of proprietors, firm members, co-partners and officers, together with the amount of their salaries; number of employes and amount of their wages; quantity and cost of materials used in each establishment; quantity and value of products; principal miscellaneous expenses; time in operation during the year; character and quantity of power used, and character and number of machines employed.

The questions as outlined above will be covered by the general schedule which every establishment will receive. In addition to this a supplemental schedule will be sent to the 68 principal industries as classified by the Census Bureau. This supplemental schedule will allow detailed statistics of output to be set forth under the heading "products manufactured."

The census of manufactures is limited to manufacturing establishments with an annual product of at least $500, conducted under what is known as the factory system, exclusive of the so-called neighborhood, household and hand industries. However, no establishment is too small to be counted by the Government if it comes within the definition of a manufacturing establishment.

Census Bureau officials emphasize the fact that all information gathered by the census is strictly confidential, made so by Act of Congress, and is for general statistical purposes only. The same is true of the censuses of population, agriculture, mines and quarries, oil and gas wells and forestry and forest products.

The attitude of successful manufacturers as to the value of thrift and careful management not only in their own business but in the lives of their employes has been made strikingly evident by the action of the Associated Industries of Massachusetts. At a meeting recently held in Boston, the manufacturers of that State declared themselves unqualifiedly in favor of the efforts of the Treasury Department to create habits of thrift among the people of the country and endorsed especially plans to increase thrift among industrial employes.

What's the Matter with the United States?

Do you know the young fellow who works for $25 a week and who is wearing a new winter suit that cost $85?

Do you know the wage earner who loafs because he is afraid if he does too much he'll "work himself out of a job?"

Do you know the housewife who is ashamed to be seen with a market basket on her arm or to carry home a bundle?

Do you know the manufacturer who, when the price of raw materials and overhead goes up 5 per cent. and the cost of labor advances an equal amount, adds twenty-five per cent. to the price of his goods?

Do you know the factory girl working for $18 a week who is buying and wearing a $350 fur coat?

Do you know the man who lets a fresh clerk sneer him into buying a $15 hat for fear he'll seem "cheap," when he can buy a satisfactory one for $7?

Do you know the investor who has traded his Liberty Bonds for a promise of a hundred per cent. profit in a stock company backed by a dishonest promoter?

Do you know the married couple who do not think enough of their children to buy War Savings Stamps for them and to teach them to save?

Do you know the shopper who says "Wrap it up" instead of "How much?"

Do you know the person who lets the desire of the moment destroy the results of days and weeks of thrift and saving?

Do you know the man who thinks it is not necessary to save?

Do you know the man who says the Government savings securities, Liberty Bonds, War Savings Stamps and Treasury Savings Certificates, are too slow or too small or too old-fashioned for his investments?

If you do, you know pretty well what is the matter with the United States.

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Invest in Community Health

It used to be said that money could not buy health. This is true of individuals, acting alone, but it has no application to the community. In these days a community gets just about as much health as it pays for. If it spends an amount equal to five or ten cents per capita on measures and facilities for the cure and prevention of disease it gets a poor quality of health. On the other hand, if it spends $1.50 or $2 per capita, as it should do, the investment yields the superior return of healthier and happier people.

As all health movements are bound up in greater or lesser degree with the effort to control the most serious of all disease menaces, which is tuberculosis, the Red Cross Christmas Seal is the greatest single factor in inducing communities to make larger investments in health, a work sadly needed because of the fact that most communities are spending less than their conditions require.

It is the Red Cross Seal that provides the money for the fight against the "White Plague." Working through the National Tuberculosis Association and a thousand State and local organizations it brings about the establishment of clinics and dispensaries and hospitals and sanatoria, it sends the visiting nurse to the homes of the afflicted; it cares for the sick and their dependents; it saves lives; solaces and relieves where it cannot cure, brings humanity closer together, and makes each community more watchful of the welfare of its people.

Red Cross Funds Are "Seed" Money

Not all this is done by directly providing the funds. That would be impossible. Red Cross Seal money is the "seed money" which grows the funds with which such work is accomplished. In Illinois, for instance, $10,000 of "seed money" performed the miracle of building thirty-one tuberculosis hospitals costing several millions. The millions were the people's, of course, but the Red Cross Seals induced them to invest it.

Now the time has come when a large amount of "seed money" is needed. There is more tuberculosis in the United States than has heretofore been suspected. Although preventable and curable, this disease, according to a recent survey, has an annual death roll of 150,000 and is at present afflicting more than a million persons. Such a condition calls for an intensive campaign to combat the disease, a campaign to cover the nation so thoroughly that approximately $6,500,000 will be required to carry it on for a year. The necessary campaign has been planned, and again the Red Cross Seal will provide the "seed money."

These symbols of hope and rescue and safety will be sold throughout the country for a ten-day period beginning December 1st. A great work is to be done, and the required funds must be raised. No one should hold back. This is not charity; it is an investment in community health, and every purchaser of Red Cross Seals will help to increase his own safety.

Grangers Want Nation-Built Roads

Farm sentiment throughout the United States is overwhelmingly in favor of governmental participation in highway construction and maintenance if letters received recently by officers of the National Grange can be taken as indicative of rural opinion on this subject.

Not long ago the Washington representatives of the National Grange sent out a letter to every State official of that organization in which was enclosed a letter from Senator Charles E. Townsend calling attention to his measure for a national highway system and a federal highway commission and explaining the reasons which he felt made necessary a broader national road policy.

Responses to this communication have thus far been received from local granges in 21 States and the proportionate result has been 12 votes to one in favor of the adoption of the Townsend bill. The replies range from Maine on the north down to West Virginia and as far west as Washington and Oregon. The bulk of the answers come from the Northern States, as the larger membership of the Grange is found in these States.

In each case the reply has been made only after the matter has been considered by the Grange membership before which the subject was placed. For the most part the writers were content to give unqualified endorsement to the measure, but where more detailed letters were written, a strong feeling was disclosed that the Government is big enough to take care of the national highway itself and that it should seek to do so as rapidly and as economically as possible. The opinion was further expressed that it is only through such a policy that a national system can be obtained which will not overburden the man who lives near the road.

The letters written to the granges on this subject were simply preliminary to a general consideration which will be given this subject by the National Grange, subsequent to the annual convention which was held in Grand Rapids, Mich., November 12 to 21.

Uniform Trailer Legislation Sought

At a meeting held in Washington during the first week of November, at the headquarters of the Federal Highway Council, it was decided to incorporate the recommendations of the Trailer Manufacturers Association of America in the uniform traffic bill which has been in process of formulation for more than a year.

There has long been a widespread demand for nation-wide uniformity in motor vehicle laws by motor truck owners whose business requires them to operate in several adjoining States and also by automobile users who travel extensively by motor car. The inconvenience and absurdity of having different regulations in neighboring States is recognized by State authorities, who have displayed keen interest in the forthcoming draft of a measure which is designed to make such regulations uniform throughout the country.

Trailers are such a recent development in highway transportation that very few States license them or have any regulations covering their operation. Within the last year or two Massachusetts, Connecticut, Pennsylvania, Indiana, Michigan, Illinois, Wisconsin, Texas and California have enacted some trailer legislation, but it was evident that the legislators were unfamiliar with the types of trailers in service, the ways in which they are used and the probable future development along this line.

It was deemed desirable by the trailer manufacturers, for these reasons, to offer constructive suggestions for legislation that would insure protection of improved highways and safety to users thereof without operating to retard the development of a new and economical means of transportation of great benefit to the whole public.

The recommendations, as approved at the meeting last month, provide for registration of trailers and semi-trailers, fix annual fees at 15 cents per 100 pounds gross weight of trailer, body and rated load capacity on pneumatic tires, 25 cents on solid rubber tires and 35 cents on iron or steel tires.

They require one number plate on the rear end, limit weight on any one axle to 22,400 pounds, weight per inch width of tire to 800 pounds, and the maximum length of trailer trains, including towing vehicle, to 85 feet.

The provisions call for use of a safety chain to prevent a trailer breaking away from the towing vehicle and a white light to be carried at the front of each trailer at night and a red light at the rear end of the last trailer.

They provide also that the weight of the trailer and its carrying capacity must be shown on the side, and authorize highway authorities, at their discretion, to issue special permits for the operation of trailers exceeding weights and dimensions fixed in the bill.

National organizations represented at the meeting were the Federal Highway Council, Highway Industries Association, National Automobile Chamber of Commerce, Motor and Accessory Manufacturers Association, American Automobile Association, Trailer Manufacturers Association and National Automobile Dealers Association.

The uniform traffic bill is now being redrafted to include the trailer provisions, and will be submitted for final approval of these associations and to the Association of State Highway Officials. It will then be printed and offered for introduction in the twelve States whose legislatures meet in January.

When a fine arts club was recently organized in Akron, Ohio, it was found that there were nearly 50 artists of unusual ability employed in the art departments of the rubber industries. The Goodyear Tire & Rubber Co. pays $50,000 annually for art in oils, water colors and sketches that go to make up designs for cover pages in five house publications and to illustrate folders, pamphlets, posters and advertising. The Goodyear art department under A. E. Boedeker turned out 300 drawings this year for foreign advertising alone.

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The New Era in Transportation

Many people do not yet realize that thirty or forty truck lines for freight traffic are running out of Brooklyn, some upon regular routes on Long Island and elsewhere, and many of them available for shipments anywhere.

The motor truck is the solution of the food problem. In some large Western cities the milk supply comes in by truck, saving two cents a can on cost of transportation. From Long Island the truck lines, reaching every farmhouse, bring in shipments of food supplies to New York City, saving one handling at each end as compared with railroad shipment, and cutting down the time by fifty per cent. City trade is equally benefited, for the farmer orders his own supplies by telephone and has them delivered at his door, and the manufacturer makes deliveries of orders within a radius of hundreds of miles.

This method of transportation needs only to be known to have a tremendous and rapid expansion. It is cheaper than the railroads because the cost of operation is less and the service is direct; a real economy, that benefits the whole community, is effected by the increasing use of this means. As soon as shippers generally learn what a great saving in money, time and convenience is available they will not hesitate to use the motor truck instead of the slower and more costly railroad.

We are at the opening of a new era, like that which ushered out the old stage-coach days. The age of improvement is not past. The progressive leaders who are making right use of this new opportunity are justly rewarded, while the whole community is benefited.

The motor truck as it has been evolved by American science and native ingenuity is the natural medium for bringing producer and consumer into close contact, the one with the other. The truck can go direct from farm to store or to all parts of the country, and will be of inestimable value, especially in bringing the products of the rural districts to the city markets. There is no doubt that this will have a considerable effect in lowering the cost of living.

New York State is taking the lead in this matter. In fact, it has not only taken official recognition of the importance of the motor truck to the common weal through Governor Smith's recent action, but also by arranging for a rural motor truck express exhibit, under direction of the State department of farms and markets, at the State fair which was held at Syracuse on September 8th last. The purpose of this exhibit was to demonstrate that the motor truck is a potent means of reducing the cost of living to the consumer, and at the same time of increasing the return to the producer.

Without the truck we do not know what would have become of civilization in war time. The truck made possible the successful conduct of the war. At the very beginning of the world war the truck, improvised from taxi, pleasure automobile and bus, saved the day for the allied armies and throughout the war it prevented disaster. The outstanding feature of the war, the one new thing in the war that stood the test, was the "tank." The war tank is an evolution from the caterpillar tractor. Ludendorff, no mean authority, insists that the "tank" defeated Germany at the critical hour of the war.

During the exigencies of the war the motor truck was called in to save the transportation situation. Since that time a great deal has been done to make the truck an auxilary of the railroads. The truck is here to stay. Its purposes and uses will be increased from time to time. The day is not far distant when the steam road will be employed, and fully employed, on the long haul, on transcontinental and interstate transport. No one will think of making comparatively short trip freight shipments by rail. It will be too expensive.

Industrial Accident Prevention

As a direct result of the inspiration for the extension and improvement of industrial accident prevention work received by the 3,000 men and women who attended the Eighth Annual Congress of the National Safety Council at Cleveland recently, plans are under way in about a dozen cities for the formation of local safety councils, and in a number of cities where such councils already are in existence for the appointment of permanent paid local secretaries.

In response to the calls for assistance in the perfection of such organization plans, C. W. Price, general manager of the National Safety Council, and the various field secretaries of the council have during recent weeks visited Detroit, Rochester, N. Y., Toledo, O.; Springfield, Mass., Kansas City, Mo., Buffalo, N. Y., Wilmington, Del., Philadelphia, Pa., Joliet, Ill., and a number of other cities.

In addition to the activities among members of the National Safety Council looking toward the formation of local councils, a strong tendency on the part of chambers of commerce, manufacturers associations and similar organizations to promote the organized prevention of accidents has become manifest. The Civic Industrial Department of the Chicago Association of Commerce recently called a conference of about 500 men prominent in industry and devoted an entire afternoon to a discussion of accident prevention.

Business Books for Holiday Gifts

So wide-spread has become the interest among the business-reading public in business literature that the A. W. Shaw Company, publishers of "System," and the Shaw Standard business books, will this year conduct a Christmas and New Year business book campaign. To the ambitious man or woman a business book is one of the most useful gifts of all. Certainly one that is most practical and far-reaching in effect. For the vital, helpful information in business books means promotion, savings in time and money, and larger earnings for the reader.

Nowadays there are business books that will meet practically all requirements. If you don't know just what to get your son, ask the clerk for a book on the work in which he is interested. If it is selling, look at Watson's "Knack of Selling"; if correspondence, Smart's "How to Write Business Letters"; if office work, McClelland's "Office Training and Standards." Regardless of what he does there is a popular-priced title that will help him earn more. Or if you seek for your son, husband, business associates or friends in trade, complete sets for thorough study, ask for the series that will aid them the most.

The Shaw people have issued their books in series. For the banker there is the Shaw banking series; for the sales manager, the Shaw selling series; for the factory manager, "The Library of Factory Management"; for the young man, "The Shaw Business Training Series," and so forth.

During recent years business book sales have rapidly increased. This latest development to organize the business for the holiday trade gives the business-reading public an opportunity to give and secure as gifts books of usable, money-making ideas.

Possible Shortage on Bodies

A writer in "The Car" (London) says: "I was talking to a well-known body builder last week, and he told me that he anticipates a serious shortage of bodies when the chassis begin to come through in quantity next year. Not only is there shortage both of material and skilled labor, but the volume will be unprecedented, and many firms have been booked right up by motor manufacturers to build standard bodies for them exclusively. This, from the body builder's point of view, is far less remunerative than special orders, but it has the merit of safety—and some practically unknown firms are already booked up a couple of years ahead."

Delivering Packages by the Million

How to deliver economically a package every one and one-quarter seconds for eight hours a day, three hundred days in the year was a problem that faced the delivery service department of a large New York department store. This store delivers annually 6,750,000 packages ranging in size from an eight inch square box to a household refrigerator. To accomplish this work, 150 gasoline and electric trucks and 500 men are employed. The trucks are of two sizes, three-quarter ton capacity for retail delivery and two-ton capacity for freight hauling.

A package, after leaving the wrapping room, is placed on an endless cánvas conveyor belt at which men, known as sorters, are stationed to classify the packages according to address. Wooden bins, which are numbered to correspond to certain sections of the city, each section making a route, line the side of the conveyor opposite which the sorters are stationed.

As the packages travel on the conveyor belt they are taken up by the sorters and

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placed in the bin which embraces the territory in which the package is to be delivered, as shown by the address. These packages are then receipted for by the driver who sorts them, placing those that are to be delivered last in his truck first and those that are to be delivered first in last.

This method of packing saves a great deal of time during delivery, for at each stop the package to be delivered is removed without looking through the entire wagon and also avoiding the necessity of handling the same package many times.

It is sufficient evidence of the excellence of the system when a store which has fifty or more departments and delivering over 22,000 packages a day, can promise that a customer making a purchase in the morning will receive it in the afternoon, of the same day. Mistakes are rare occurrences. The simple, yet efficient, system employed, checks each package three times by three different persons. System and the motor truck make it possible to handle rapidly, economically and without confusion almost seven million packages a year.

American Cars in Spain

It is estimated that there are about 100 automobiles in use in the vicinity of Vigo, Spain. They are practically all passenger cars and about one-half are of American manufacture. The American-made cars were nearly all imported since the beginning of the war and are very popular. Their sale at present is hampered by slow deliveries; for example, of an order for 30 cars given six months ago only three have been delivered.

The demand for cars has hitherto been confined largely to the upper classes, who desired a fancy, showy vehicle. The freights also were formerly not so high, but are now such as to make a cheaper car sufficiently expensive for the less wealthy persons who are interested in the purchase of automobiles. Prices at Vigo are almost double those prevailing in the United States.

The sale of automobiles during the latter years of the war was impeded by the scarcity and high price of gasoline. Now that gasoline is readily procurable and the price somewhat lower (but still about $1 per gallon) and tending to decrease, this is no longer a deterrent factor.

In the Valencia district 1,245 passenger cars and 12 motor trucks are registered. The city of Valencia alone has 580 passenger cars for a population of 300,000. Murcia has 286 passenger cars and Alicante 208.

The number of motor vehicles officially registered in the district of Corunna on September 1, 1919, was as follows: Private automobiles, 241; motor busses, 47; trucks, 3. The authorities state, however, that these statistics are not exact, but merely approximate, many changes in the ownership of cars not being reported to the Civil Government. There are a large number of motorcycles, but these are not registered at the provincial bureau. The number of motor cars for hire is not given; but there are eight doing service on a regular route.

"Commercial Spanish"

Mr. Carlos McHale, instructor in Spanish in the National City Bank of New York, has prepared a book called "Commercial Spanish," which D. C. Heath & Co., New York and Boston, have published for general sale. This book is instructive not only as regards the bare language, but it takes the reader through discussion of Spanish business customs, methods of conducting commercial transactions, etc., all in the Spanish of everyday commerce, so that the student is in a practical atmosphere of business Spanish while he is learning the language, although the grammatical drill is correct in every way for purposes of a general knowledge of the tongue. The book is intended for those who have already begun the study of Spanish and have some knowledge of its grammar. The price is $1.50, post paid.

No Economy in "Cheap" Tires

There is probably no form of automobile extravagance greater than that practiced in buying tires, and a great deal of this extravagance lies in the purchase of "cheap tires" that the dealer is sure are "just as good" as the well made standard tires made by great factories with big organizations behind them.

But car owners who study tire matters for themselves, are rapidly coming to realize that the purchase of these cheap tires is a waste of money—that in the end the well made standard tire, whose initial cost is a little more, shows the lowest cost per mile and provides the most satisfactory riding. These motorists are fast coming to see the difference between mileage as adjusted over the counter, and mileage delivered on the road. There are plenty of good, standard-made tires on the market at reasonable prices, and there is no reason for taking chances with the "cheap" kind.

A Hint From Ford

The Ford Motor Company is perhaps the first to work out a practical system of grouping its employes at the street car stops and training them to enter the cars in a systematic and orderly manner, thus increasing greatly the rate of loading and reducing to a minimum the number of accidents caused by carelessness in boarding the cars. This system, together with the staggered hour method of dismissing employes at the end of their day's work, makes it possible for the street railway company to handle about 20,000 employes in two hours without interfering perceptibly with its normal schedule.

Aircraft Production in France

In 1915 France built 3,400 airplanes, 7,552 in 1916, 22,751 in 1917, and 34,219 during the first nine months of 1918. The airplane factories employed 12,650 workers on January 1, 1915; 30,960 on January 1, 1916; 68,920 on January 1, 1917; 131,551 on January 1, 1918, and 186,003 on November 1, 1918.

N. A. C. C. Service Managers' Division

In the interest of better service for American motor vehicle owners. The National Automobile Chamber of Commerce held a three-day meeting of service managers at the Hotel Statler in Detroit, November 10 to 12. About 150 were in attendance at this largest gathering of the kind that has ever been held, denoting keen concern on the part of car makers to perfect methods and means for properly caring for the needs of users of their output. The motor vehicle industry is one of the few whose problems go beyond production and distribution. Purchasers must be kept satisfied or sales will not continue, and without sales production must come to an end. Hence service forms a third and indispensable leg for the support of the industry. It becomes a matter of business, therefore, to see that this element is given due consideration.

Will Raise Service Standards

The active participation in the discussion of the comprehensive program of topics was further evidence of the manufacturers' determination to raise the standard of service by scientific study of its problems. All angles were considered at the four sessions—general service policies, factory service organizations, relations between factory and dealers and relations between distributors or dealers and customers.

The most significant outcome of the meeting was the proposal that a Service Managers' Division of the N. A. C. C. be formed with a special department to handle it, and a resolution to that effect was passed recommending the proposition to the consideration of the Board of Directors. The plan laid down further contemplates subsequently organizing local sections in Buffalo, New York, Cleveland, Indianapolis, Detroit, Chicago and the coast, for factory service men and the encouragement of the formation of special local associations of service men employed by dealers, garages and repair shops, possibly in connection with local dealers or automobile trade organizations or the National Automobile Dealers' Association.

Experiments with Glued Joints and Plywood

Experiments not yet completed at the Forest Products Laboratory, Madison, Wis., indicate that the thickness of the glue line in plywood may vary considerably without noticeably affecting the shear strength. In heavier joint work, however, the thickness of the glue line apparently has much to do with the holding power of the joint.

Plywood specimens glued with animal, vegetable, casein, and blood albumin glues, and soaked for 20 weeks in gasoline, engine oil, and castor oil at the laboratory, showed no separation of the plies. Shear tests, however, gave evidences that a gradual weakening of the glue was going on. The loss in strength in no case was as much as would be caused by the standard test of soaking for 10 days in water. Copies of reports of tests can be obtained by interested parties on application to the Forest Products Laboratory.

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

XI. THE CARE AND MAINTENANCE OF MOTOR CAR SPRINGS*

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

The motor car repairman desiring his customers to obtain the maximum comfort and pleasure from their cars will do well to emphasize spring care and maintenance. For through proper spring care and maintenance, easy riding is secured, and the owner is relieved from annoying squeaks, rattles and delays through spring breakage. It is safe to say that as many springs are broken from improper care, as from any other cause.

Considering first a new car, the following points should be noted in caring for the springs. Once a week all of the spring eyes and shackles should be lubricated. The present tendency seems toward the use of oil cups, instead of grease cups, and if oil cups are present it will take about ten minutes to oil the spring eyes and shackles. If grease cups are present, it will require somewhat longer.

It is chiefly on this account that oil cups are becoming more popular than grease cups for spring lubrication. While grease lasts longer, can be forced into the bearings, and tends to force any grit or dirt out, oil tending to wash it in; it is considered that the ease with which oil may be inserted will tend to encourage more frequent lubrication, and therefore lengthen the total spring life.

After the first five hundred miles, the axle clips should be examined. These clips hold the springs to the axle, and tend to loosen up in this distance due to adjustment between the various surfaces. The clip nuts should be tightened down as tight as possible (not, of course, tight enough to injure the threads) so as to prevent shifting of the parts. Ordinarily it is not necessary to henceforth tighten these nuts oftener than once in every two months.

To Lubricate or Not to Lubricate

Now comes the question of lubrication between the leaves of the springs. This is a point upon which engineers and spring manufacturers have disagreed, and as yet have come to no single conclusion. The first school states flatly that lubrication between the leaves of a spring tend to make a car hard riding; that easy riding is a result of a shock-absorbing action from inter-leaf friction. To place a lubricant between the spring leaves, they state, will destroy the inter-leaf friction, so that the springs will be "snappy," throw the car, and possibly allow the springs to rebound to the point of breaking.

The other school states that easy riding qualities are to a marked extent the result of elimination of inter-leaf friction. In other words, to cushion the shock, the springs should "give" readily.

It is not the author's intent to enter this controversy beyond the point of simply stating the two premises and to describe the best method of lubrication, if lubrication is desired. Certainly, however, the majority of the repairmen throughout the country belong to the latter school, and apparently the best method of stopping a spring squeak is by greasing between the leaves.

Inter-leaf Lubrication

In Fig. 1 is shown a tool that is extremely handy in spreading the spring leaves apart for the purpose of inter-leaf lubrication. It consists of a U-shaped piece of flat metal, having one leg bent over and forged to a knife edge; the other leg being straight and carrying a conical pointed screw that is directly opposite the knife edge. The U-shaped piece is wide enough between the jaws to pass over the majority of springs, and the knife edge and conical point should be case hardened to reduce wear in service. This tool can readily be made up, or one similar to it can be purchased from almost any jobbing house.

On a new car, inter-leaf lubrication usually takes place after the first 1000 miles, though if a squeak occurs, it may be effected sooner. The first step is to jack the car up on a jack placed beneath the car frame sufficiently to take the weight off the spring upon which it is desired to work. Some repairmen continue this jacking-up process until the leaves open, but this is not good practice, and it places too much strain on the top, or master leaf.

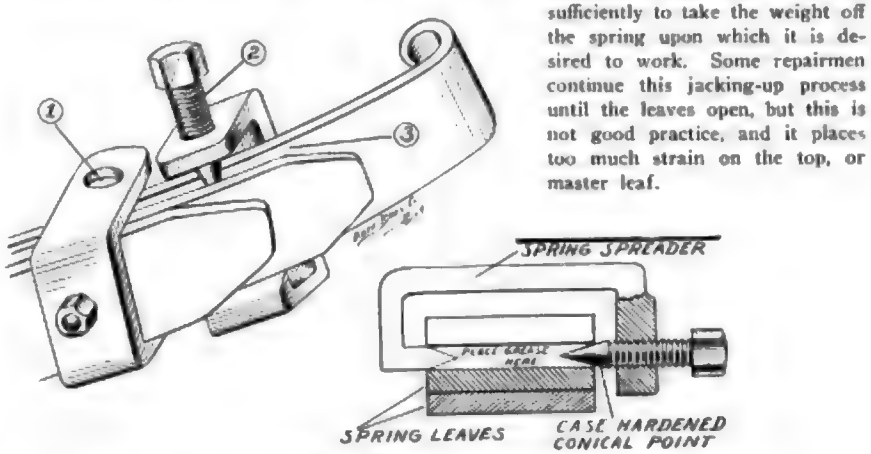


Fig. 1—A simple method of lubricating springs. 1—Loosen rebound clips; 2—Spread leaves one by one with spring spreader; 3—Apply graphite and grease between leaves.

The next step, shown in Fig. 1, is to remove the bolts from the rebound clips, and force the leaves apart, one by one, by means of the spreader previously described. Graphite grease, or a mixture of graphite and grease, may be then inserted by means of a grease gun, or spread on with a putty knife. This grease should be applied liberally, particularly at the ends of the leaves, which is the position of maximum pressure and motion. It will doubtless be impossible to work the grease down into the center of the spring, but after it has been worked as far as possible, a few drops of oil may be inserted. This will work its way to all parts.

Short Method of Oiling

Oftentimes a squeak will occur at a time when it is not desired to go into oiling as thoroughly as is described above. In such cases, simply painting the ends of the leaves with a stiff brush soaked in oil will remove the squeak. This oil is worked into the springs through their action in driving.

* Appreciation of the information received from the Sheldon Axle and Spring Co., Wilkes-Barre, Pa., and from the Standard Parts Co., Cleveland, Ohio, is herewith acknowledged.

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Care of Rebound Clips

Rebound clips, though usually not considered of prime importance by car owners, have the extremely important function of damping the rebound, and preventing possible breakage on the up-throw. Particularly the ones near the ends of the springs should be examined, as these come into action first. If the bolt is lost, or the clip otherwise broken, all of the rebound will be concentrated on the master leaf. This breakage of clips is often caused by binding at the sides. They should be free to swing backward and forward along the leaf. The

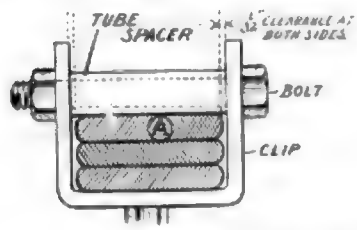


Fig. 2—Any binding or pinching of the rebound clips will tend to break them off, and thus increase the possibilities of spring breakage. To prevent this the clips should be 1/16 in. wider than the spring, and the tube spacer above it the thickness of a piece of paper (A).

proper clearance for the clips is shown in Fig. 2, namely, at least 1-32 in. at each side between the clip and the leaves, and the thickness of a sheet of paper between the tube spacer and the adjacent leaf.

If a piece of paper cannot be passed between the tube spacer and the leaf, it is possible that the clip is bent sideways, and a few light hammer blows may be necessary to bring it into alignment.

Replacing Spring Shackles

Care is necessary in replacing the links, shackles and hangers by which the spring is attached to the car, as binding may also occur here. In Fig. 3 is shown a conventional spring shackle, in which two bolts are required to fasten the spring to the car. The point to be noted is, that whichever bolt is inserted first, it should be tightened down, released one-quarter turn and locked, and swung back and forth to see that it is hand free, before inserting the other bolt and making the attachment complete.

Concerning Welding of Broken Springs

The consensus of opinion relative to welding broken springs is "don't do it." It is true, that if the weld is between clips, where there is but little bending, the leaf may stand up for a long time—occasionally several thousand miles. Spring steel is a high carbon steel, running around 1 per cent. of carbon, which in addition to being hard to weld, requires the proper heat treatment to make it "springy." In certain instances, alloy steels are used, such as chromium and silicon, which added to the high carbon content makes welding still more difficult.

Where an emergency or temporary repair is desired, in the case of a broken leaf, the method shown in Fig. 4 may often be applied. This comprises simply a metal clamp or splint that is bolted over the spring at the point of break, and holds the parts together. In no sense of the word is it a permanent repair, and should only be used until a new leaf or spring may be secured.

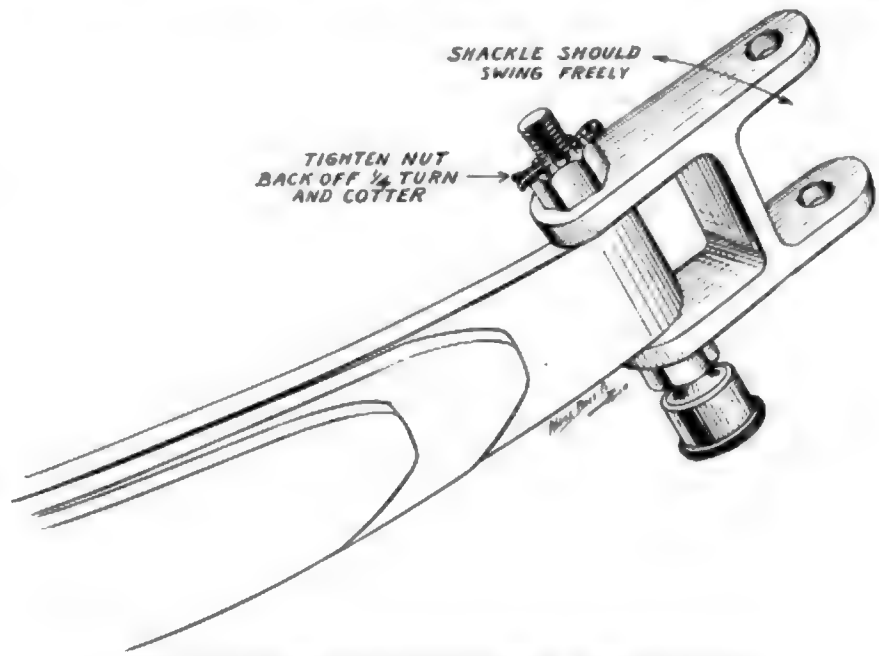


Fig. 3—There is danger of binding at the shackles. These should be free.

Furthermore it is not considered good practice to substitute a leaf, either new or old, for a broken leaf, unless the spring in which the break occurs is a new spring. In this case, the broken leaf is doubtless the result of a defect, and the substitution of a new leaf will bring the spring back to its original utility. If the broken leaf is in an old spring, the break is doubtless the result of a gradual wearing out—for springs *do* wear out—and an entire new spring is advisable.

Yearly the springs should be removed from the car, cleaned, inspected and replaced. The method of inspection is to take each leaf, one by one, hold it loosely in the hand at the center, and strike it a few sharp blows with a hammer, as shown in Fig. 5. A clear ringing sound indicates the absence of cracks. If it is desired to lubricate the springs, they should be lubricated on assembly.

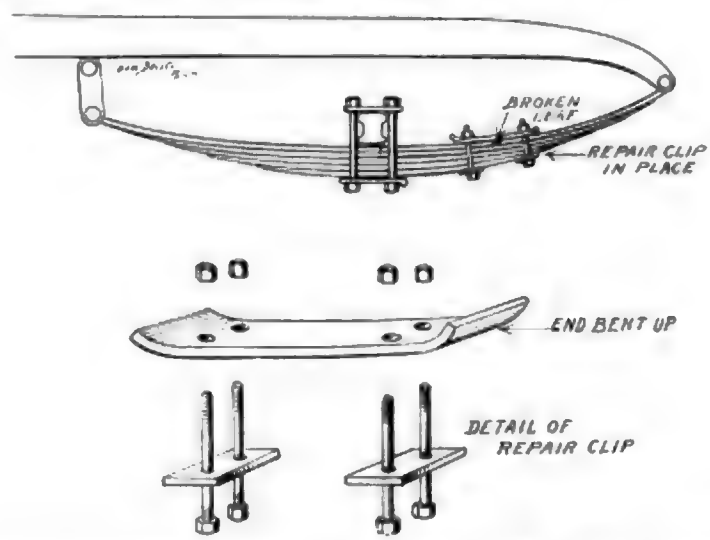


Fig. 4—A temporary or emergency repair may be effected by a repair clip. Welding is sometimes used, but is also an emergency repair.

Spring Suspension and Remodeling

Spring suspension must be considered when remodeling cars—such as changing from a roadster to a touring body, or from an open to a closed body, etc. The best method is

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to secure the proper springs from the car manufacturer.

However, the job may not merit the expense, and then it may be advisable to make certain modifications of the springs at hand. In the case of changing from a light to a heavy body, an extra leaf may be inserted between the second and third leaves, and possibly a short plate spaced between the original short plate and the spring seat. In making a shift the other way—from a heavy to a light body, spring leaves are often removed, with benefit to the riding qualities. It should be remembered, however, that in making the above weight changes, the rear wheels are the ones upon which the greatest change in weight occurs. When special problems come up, consult your spring maker.



FIG. 5. On reassembling a spring after overhaul, each leaf should be taken one by one, held freely, and tapped. A clear ringing sound indicates the absence of cracks.

Clean Up!

By R. C. REICHEL, Chalmers Service Manager, in The Maxwell-Chalmers "Punch."

Would YOU like to work in your Service Repair Shop?

Walk out into your service repair shop now. Look at the lights; look at the walls and floors and see whether you personally feel you could do good work in the shop as it is at the present time. If the walls are not painted white, if the lights are poor and if the floor is greasy, stop to consider the effect on the workmanship of the men who have to work in a place of that kind.

Grease can be cleaned off of concrete floors. Pans and buckets for use in draining oil and grease from cars can be obtained at a small cost. The walls can be painted at a moderate cost. Lights can be properly arranged at a moderate cost. A man should be delegated to see that the floor and general shop is kept in clean condition. If your shop is not in first class condition now in this respect, try cleaning up for a month and notice the improvement in workmanship. Mechanics should be required to wear clean overalls, changing them at least each two or three days. Covers should be provided for fenders and the interior of closed cars, and repair jobs which require over five hours' work should be washed before delivered to the owner. This in itself will do more to convince the owner that your workmanship is first class than anything else that you can do. We have found it will eliminate practically all of the comebacks on repair jobs.

Start today and clean up your repair shop. Provide ample pans and buckets for grease, and after this is done fire the man who spills grease on the floor. Wash repair jobs. Try this and you will never go back to the old condition. Remember—the man who will work on a floor ankle deep in grease without kicking is not the kind of workman that you want in your establishment.

War Service Appreciated

The Dunkirk "Evening Observer," published at Dunkirk, N. Y., the home of The Mulholland Company, has printed a communication received by the latter concern from the U. S. War Department.

The Mulholland Company, which is very well known to our readers, during the war gave valuable assistance to the Government, and their services were officially recognized as per the letter referred to, and of which the following is a copy:

"THE MULHOLLAND COMPANY,
"DUNKIRK, N. Y.

"1. The models of the Radio Repair and Operating Trucks which were built by the Mulholland Company, Dunkirk, New York, and which were intended for service with the American Expeditionary Forces in France, have been delivered to Washington.

"2. The officer designated by the A. E. F. to inspect this development and pass upon its utility has pronounced these trucks "excellently constructed, very well arranged and entirely suited for the purpose for which they were designed." The structural features of the bodies have been the subject of very favorable comment by the Government automotive engineers and the ingenuous arrangements for the mounting and operation of delicate radio apparatus are especially to be commended

"3. The officer in charge of this development desires to express his appreciation to the officials and employees of your company for the energetic, skillful manner in which this work was prosecuted and for the sincere, patriotic spirit which made possible this important contribution to Army motor vehicles.

"By direction of the Chief Signal Officer.
"A. D. CAMERON,
"Capt. Signal Corps, War Dept."

The Mulholland Company has recently been favored with additional orders from the Government upon which they are now working. At the same time, having ample facilities, they are also doing a splendid business with the leading motor truck manufacturers and distributors.

Mulholland Standardized Truck Bodies

The Mulholland Company, Dunkirk, N. Y., is now prepared to furnish all their body styles in six lengths of platforms, making them suitable for trucks of from one to five tons capacity. This concern has just issued an illustrated catalog showing their series of standardized bodies. A platform is the basis of the entire line upon which it is easy to adjust any one of the fifteen different body styles comprised in the Mulholland standardized line.

A Million-Dollar Motor Truck Line

The Patriot Motor Express Company of Wichita and Kansas City, Kansas, the first million dollar organization of its kind, has begun operations. Its first routes are between Atchison and Kansas City via Leavenworth and other intermediate points, and between St. Joseph and Kansas City. Trains of two large motor trucks each will make trips every day regardless of weather conditions. In the cities the trucks will stop at the loading docks and warehouses of wholesale concerns, and will pick up grain, livestock and other farm products from farmers along the route. The company for the present is running one line between Atchison and Kansas City, a distance of about 75 miles, and two lines between St. Joseph and Kansas City, a distance of about 25 miles.

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Dyke's Automobile Encyclopedia

This remarkable book has again been revised and greatly improved. It could appropriately be termed a "Repairman's Guide." In addition to its mass of information on automobiles, covering every detail from the construction and repair of the axle to the repair of radiator and top, many new subjects have been added. For instance: how to make electric tests of the starting motor, generator, battery, coils, magnetos, etc. In fact, the subjects are dealt with in such a simplified manner that one can almost understand by a mere glance at the numerous illustrations.

The storage battery subject is profusely illustrated, and anyone who can read plain English can soon learn how to diagnose trouble, dis-assemble, repair, assemble and recharge batteries. A feature of this instruction is a simplified explanation of the "Cadmium Test" of a storage battery. One naturally thinks of a very technical and complicated subject, but after reading this subject and a glance at the numerous illustrations the "tech" part becomes perfectly clear.

Then there are many other subjects which the average repairmen must know about, such as fitting pistons and piston rings, etc. The tire subject is very interesting. One learns the difference between the "molded" tire and "wrapped tread" tire. The difference between the "fabric" tire and the "cord" tire and the advantage and disadvantage of each. Such subjects as blow-outs, stone bruises, loose treads, etc., are thoroughly treated with an explanation of the cause and how to repair.

The subject of vulcanizing not only deals with the "sectional" method, but also the "wrapped tread" method. The equipment necessary to start into the tire repair business is also dealt with. In fact, many pages are devoted to the subject of "how to start into the different branches of the automobile business," from building and equipping a home garage to that of one for business.

The book covers practically every phase of the automobile industry and deals with automobiles, trucks, tractors, motorcycles, airplanes, airplane engines, including the Liberty engine, all fully illustrated. There are supplements, with 332 illustrations, on the Ford and Packard cars, part printed in colors. Every detail of the Ford is explained. The Ford new electric system is fully illustrated, in fact the illustrations go so far as to show the internal wiring of the "cut-out" and its principle of operation. There are also five colored inserts, a dictionary, and much more valuable information

This tenth edition of the Automobile Encyclopedia sells for $5.00. It is published by A. L. Dyke, St. Louis, Mo., or can be ordered through THE VEHICLE MONTHLY. During the war this book was used extensively by our Government and was also sanctioned for use in the schools of military aeronautics, England.



A Rowe three-ton pneumatic truck can be run at thirty miles an hour without the slightest injury to the mechanism or discomfort for the driver, over any ordinarily good road. This model is designed especially for pneumatic tires and is equipped with a fifty-horsepower high speed engine.

Rowe Trucks at the New York Show

The Rowe Motor Company, Lancaster, Pa., will exhibit several of their trucks at the National Truck Show in New York, January 3 to 10, 1920. The show will be held in the Eighth Coast Artillery Armory, 194th St and Jerome Avenue, which can be reached by way of the Lexington Avenue subway or the Sixth and Ninth Avenue elevated trains. The Rowe truck exhibit will be located at Space M-2 in the Armory.

The Rowe Motor Co. has still some excellent selling territory in which the Rowe truck is not represented. A Rowe agency offers a splendid chance for a man with a good, level head, who knows the truck business, to build up a business of his own. In the Rowe he will find a good, reliable truck in 2, 2½, 3, 3½ and 5-ton sizes—which will satisfy users and cement friendship in every case. He will have back of him a factory organization that will co-operate with him. Write them about an agency now; the sooner you get action the sooner you can take advantage of the brisk selling features of this remarkable truck.

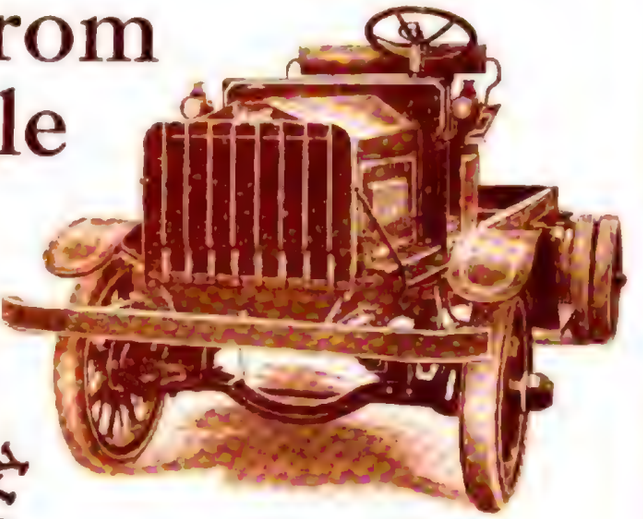


This truck carries a big load much faster than could be done on solid tires, and with so little jolting that foodstuffs arrive at their destination, not only more quickly, but in as good condition as when they leave the warehouse. It is a Rowe three-tonner

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Rowe
THE PIONEER WORM-DRIVE TRUCK

View it from Any Angle



and you will find the Rowe Truck possesses advantages that appeal to buyers in every part of the country.

It is built for service — and gives it—always running right and proving so highly satisfactory in every way that repeat orders are the regular thing.

DURABILITY
SIMPLICITY
POWER
ECONOMY
MILEAGE
ACCESSIBILITY



Be sure to read next three pages

ROWE MOTOR CO.

LANCASTER, PA.

ROWE RUNS RIGHT

ROWE MOTOR COMPANY — ROWE RUNS RIGHT — LANCASTER, PA.

Rowe Rowe

Reports of the Rowe in Action

These messages direct from users should be among the most convincing arguments that the Rowe is the right truck for you, Mr. Dealer

DEXTER PORTLAND CEMENT CO. NAZARETH PA.

DEXTER CEMENT IN STOCK

HIGHEST CASH PRICE PAID FOR WHEAT
COAL SCREENED TO ORDER

INDEPENDENT TELEPHONE

JOSEPH B. WEAVER & SON
DEALERS IN
GRAIN, FEED, SALT, FERTILIZERS
COAL, LUMBER AND FENCING

FLOORING, SIDING, PICKETS
DRESSED AND FINE LUMBER UNDER COVER
FULL ASSORTMENT OF POSTS, RAILS AND WALK STONES CONSTANTLY ON HAND

WITMER LANCASTER CO., PA. May 21, 1919.

Kelly-Springfield Tire Sales Co.,
28-34 E. Chestnut St.,
Lancaster, Pa.

Gentlemen:-

We have had one of your three and one-half ton Rowe trucks in operation for a period of six weeks, and wish to say we are very much pleased with its work. It has proved satisfactory to us in every way, such as brakes and silent gear changing. The motor is a wonder for its great power and durability in every way.

This is not the first truck we have owned, and our experience with the first one enabled us to better compare the merits of the various makes under consideration at the time we purchased.

We can heartily recommend the Rowe truck to any one who may be interested in same, and trust you will have future success in the sale of these trucks.

Respectfully yours,

Joe B Weaver & Son

ROWE MOTOR CO., Lancaster, Pa.,

ROWE MOTOR COMPANY LANCASTER PA. ROWE RUNS RIGHT

ROWE MOTOR COMPANY LANCASTER PA. ROWE RUNS RIGHT

Axford Storage Warehouse

30 WEST RITTENHOUSE STREET

LOCAL AND LONG DISTANCE MOVING
PACKING AND SHIPPING

GERMANTOWN, PHILA.
BELL PHONE

STORAGE IN SEPARATE ROOMS
FURNITURE BOUGHT AND SOLD

June 5, 1919.

Rowe Motor Mfg. Co.,
Lancaster, Pa.

Gentlemen:-

This letter explains why Rowe Dealers get the business.

I called at the Philadelphia Rowe service station for a center bolt a few days ago, and they were surprised to see me, as they said they thought I must have sold my truck, as they never saw me or sent me any repairs.

I have had the Rowe for over three years, and have spent less than fifty dollars ($50) for repairs and work done on it. I get good mileage in oil and gas (about 12-14 miles per gallon of gas), and very good mileage on tires.

Every Rowe user is a live wire booster.

I cannot help but boost the Rowe every chance I get, and I know of more than one that has been bought through mine.

Wishing you much success, I am

Sincerely yours,

Matter J. Axford

ROWE MOTOR CO., Lancaster, Pa.

ROWE RUNS RIGHT

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Rowe

THE PIONEER WORM-DRIVE TRUCK

IN PLANNING THE ROWE one of our chief aims was to make it a trouble-free truck. In order to accomplish that we knew a substantial foundation was the first essential. Accordingly our engineers devised a frame of extraordinary strength, capable of standing the strain of a very liberal overload.

We next sought the most reliable units the market afforded, the following showing the Rowe mechanism to be at the very top notch :

ENGINE:—On Pneumatic 3-Ton Model, 50 H. P. Herschell Spillman. On other models, 4-Cylinder Wisconsin.

AXLES:—Sheldon Rear axle of housing type with David Brown worm gear. Worm special steel, heat treated, with hardened differential gears. Roller and ball bearings used throughout.

SPRINGS:- Sheldon. Rear, semi-elliptic type, so slung as to minimize all road shocks.

STEERING GEAR:—Ross Irreversible, of the worm and nut type.

TRANSMISSION: — Brown-Lipe. Four speeds forward and one reverse. Gears special triple heat treated.

IGNITION:—Bosch high tension magneto.

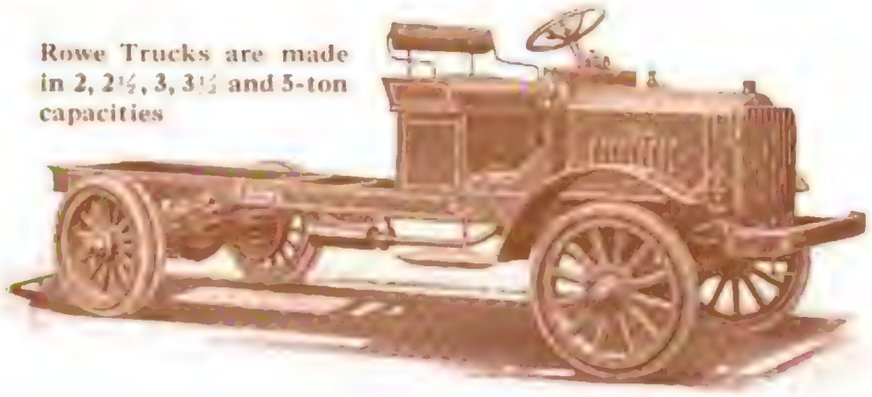
CARBURETOR:—Zenith.

Because it so splendidly constructed the Rowe is very seldom seen in a repair shop. That fact is bringing much business the way of the Rowe dealer. Get our interesting agency proposition

ROWE MOTOR CO. -:- Lancaster, Pa.

MEET US AT THE NEW YORK TRUCK SHOW, JANUARY 3 to 10. SPACE M-2, EIGHTH COAST ARTILLERY ARMORY, 194th ST. AND JEROME AVE. TAKE LEXINGTON AVE. SUBWAY OR ELEVATED TRAINS ON SIXTH OR NINTH AVE.

Rowe Trucks are made in 2, 2½, 3, 3½ and 5-ton capacities



2-TON MODEL

ROWE MOTOR COMPANY ROWE RUNS RIGHT LANCASTER, PA.

"Vehicle Monthly" Time Savers

"The Vehicle Monthly" will appreciate the receipt of any "Time Saver" made by its readers.
A rough sketch and a short description are all that is necessary.

(This series of "Time Savers" was begun in February, 1919. Back numbers may be had from the publishers)

"Vehicle Monthly" Time Saver No. 51

GASKET CUTTING DEVICE

Rubber or paper gaskets may be readily cut in almost any desired diameter by means of a simple gasket cutter that may be made by the repairman. The construction of this gasket cutter is illustrated. It consists of a maple block (C), containing a fixed pin (A) at one end, and an adjustable cutter (B) secured to a handle (D), and locked in any desired position by a set screw (E) at the other end. The pin may be a graphophone needle, and is used as a center, around which the cutter is rotated.—J. H. Moore, 207 Wychwood Ave., Toronto, Canada.

"Vehicle Monthly" Time Saver No. 52

COTTER PIN PULLER

Patented pullers facilitating the removal of cotter pins may be purchased, but one that is quite satisfactory may be made in a few moments from an old file. The file blade is heated, and forged down at one end into a hook, and then finish-filed to a round section so that it may be inserted through the eye of a cotter pin. The other end is bent half around, and left with a flat section, so that it may offer a good grip. With this puller, cotters may be quickly removed, or the ends split after replacement. —J. H. Moore, 207 Wychwood Ave., Toronto, Canada.

"Vehicle Monthly" Time Saver No. 53

TIRE WRAPPING STAND

In shops where a considerable amount of tire wrapping is handled, the wrapping may be done in a shorter time through the use of a special tire wrapping stand. In wrapping the tire on an ordinary flat bench, it is necessary to raise it each time the roll of strip paper is passed through, and to wrap the tire edgewise on the floor is tedious. With the stand shown, the tire is supported flat at a convenient height, and the paper roll may be passed around without interference.—H. F. Blanchard, Green Tire Co., Philadelphia.

"Vehicle Monthly" Time Saver No. 54

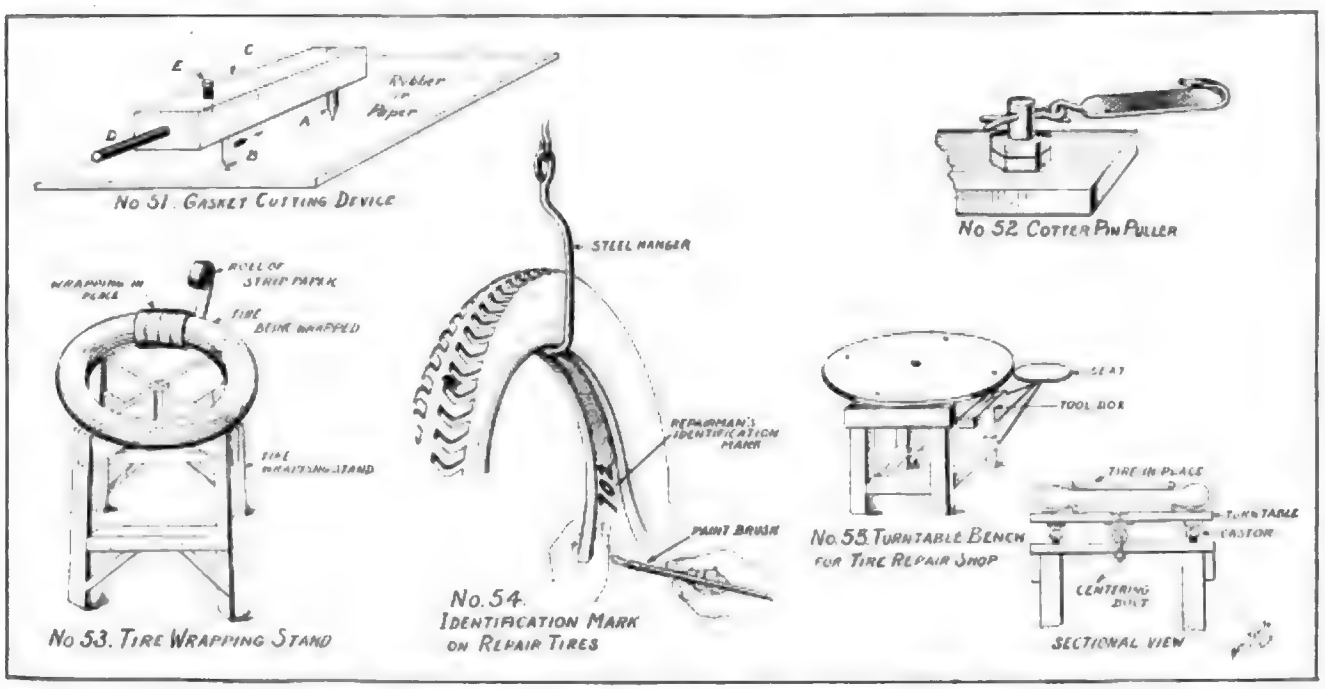
IDENTIFICATION MARK ON REPAIR TIRES

A common method of marking tires, so that they may be identified for delivery to their owners after repair is to fasten a marked tag to them by means of a cord. This method of identification, however, is open to question, as the tags are frequently lost, and it is necessary to sort over a large number of tires to find the one desired. A more efficient method of identification is to paint the repair order number of the tire on the inside, as shown. This number is painted on after the tire has been inspected, and accepted for repair. It is placed in a part of the tire that it will be not necessary to touch in effecting a repair. Red paint, thinned with a little japan drier, is used, as this is found to dry more quickly, and show up more readily than other paints. A list containing the number, owner's name, date of receipt, and repairs to be made, is of course kept for reference. Tubes may be marked in a similar manner.—H. F. Blanchard, Greene Tire Co., Philadelphia.

"Vehicle Monthly" Time Saver No. 55

TURNTABLE TIRE REPAIR BENCH

In the vulcanizing shop, many motions may be saved in repairing a casing through the use of a turntable bench. This bench is a circular platform mounted on four castors



No 51. Gasket Cutting Device

No 52. Cotter Pin Puller

No 53. Tire Wrapping Stand

No. 54. Identification Mark on Repair Tires

No. 55. Turntable Bench for Tire Repair Shop

"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ABOVE

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that rotate on a small square covered framework. The platform is held in place by a centering bolt that extends through the bench. A seat may be located at one corner, and adjacent to it are drawers for the repair tools, cement, raw rubber, etc. The tire to be repaired is placed flat on the platform, and may be readily shifted to any position necessary for repair work.—H. F. Blanchard, Greene Tire Co., Philadelphia.

Conditions in the British Motor Industry

Patriotically a people will endure ungratified wants with patience while their nation is at war, but immediately hostilities cease they assert themselves, and the longer they have been deprived of their need the more insistent is their demand to be supplied. This is just what has happened in Great Britain and, to perhaps a very little less extent, in the other European allied countries or, for that matter, all of the belligerent countries.

Initially there were restrictions against imports and at the same time practically no production, hence would-be car users were and still are paying fabulous prices for second-hand cars. With a year lapsing since the armistice was signed the manufacturers have produced very little, although they have booked orders for two years to come.

September 1 the restrictions were removed and cars have been pouring in at a great rate since, but with hardly any appreciable diminution of the demand.

Naturally this situation was attractive to unscrupulous dealers and individuals who saw in it the opportunity to capitalize it for their own benefit and so motor profiteering has been rampant. The Motor Trade Association has been doing its best to check by blacklisting those agents belonging to the Association who were proved to have accepted more than the list price for used cars. This, however, could not reach the second-hand dealers or those who purchased new cars for speculating. Large sums were paid for positions in line to receive delivery.

What has principally worried British manufacturers is the threatened American invasion. As long as it was possible they kept car imports restricted, meantime, no doubt, exerting themselves to the utmost to increase their production but impotent to make much headway on account of the difficulty of securing raw materials and especially on account of labor troubles. The "slow strike" in British factories has been a chief element of delay, the output per man being generally less than half that of 1914 and less than one-third that of the war period. As this extends to all lines it affects the raw material supplies, transport and everything else that goes into the industry.

Many lessons have been learned, however, the principal one being that American methods deserve emulation as regards both production and service. Many car users have purchased American models not alone because they were more easily procurable but quite as much because they could be better taken care of when their cars needed repairs.

One illustration will suffice to show the owner's attitude. A professional man purchased an English car before the war, broke an axle, took it to a service station within five miles of the factory and the car is there yet. He purchased another car in 1917 of English make, broke a piston, took it to a service station within forty-five miles of the factory and that is also there yet. Finally he purchased an American car. Some time later he broke an axle, as in the first car, and in five days his car was running again. These experiences being common it is natural that the American car is gaining prestige.

Some makers more philosophical than others are not disturbed, realizing that even if the threatened invasion bursts upon Great Britain, the British manufacturers whose business is on a solid footing will not be affected for a year, as their order books are already filled up for that period ahead and they could hardly hope to fill any demand in excess of that; also that before American firms can do much to capture the moderate-priced car market they will have to satisfy their home demand, which of course will take considerable time.

There is one element in the situation, however, that gives them good reason to be anxious for the future and that is that the American car today competes in quality and finish with the English product as it did not before the war, hence any hold in the British market secured by the American car is less apt to be lost when the British makers are back in production.

It is not the market in the British Isles that is of most concern but rather that in the other dominions of the British Empire where, even when business again approaches normal, the American car will have the advantage on account of price and no disadvantage in distance from the factory. Therefore, to compete abroad with American makers there is a serious disposition on the part of English manufacturers to adopt mass production methods. This alone will avail little unless they also, as admonished by English writers, match the present vastly superior American methods of dealing with customers.



NEW TYPE OF MOVING VAN ON FIVE TON WHITE CHASSIS.

This van embodies special features entirely new in body construction. The Pullman driver's cab is equipped with three separate cots for the accommodation of the crew in overland work; special ventilators are arranged over the windshield, the body and cab are equipped with electric lights, and heat is obtained from the engine exhaust. The cots are arranged so as to fold up out of the way, affording seating capacity for four passengers besides the driver. The lower body panels are built on the inside of the ribs and the upper panels on the outside of the ribs, leaving an opening the full length of the body which permits tying the load very securely for long-distance hauling. The lower half of the endgate drops down and the upper half is divided in two sections, each section swinging back against the body panels and securely held in place by catches. One luggage box is suspended on each side of the body for crew equipment, pads, etc. The interior of the body is in natural wood, the exterior is finished in dark Brewster green. This van was designed by the Brown Body Corporation, Successors to The Brown Auto Carriage Company of Cleveland, Ohio.

To Investigate Metallic Alloys

The Division of Industrial Research of the National Research Council is arranging for the formation of a co-operative association to plan and support fundamental researches in alloys. Although much valuable work has been done in this field by scattered investigators there is no doubt that a well-planned, co-ordinated effort, by a co-operative association working under the Council's guidance, composed of specialists representing both the manufacturers and the more extensive users of alloys can produce additional results of great importance. The success of other industries which have supported research on a co-operative plan, such as has been done by the National Canners' Association and the Malleable Iron Manufacturers, is evidence of this.

It is planned to create a special scientific staff composed of a director and assistant director of research and a group of scientific investigators and technical experts who shall give their whole time to the work. To finance the organization each member of the co-operative association will pay $1000 a year.

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BODY DEPARTMENT

Complete Printing Service

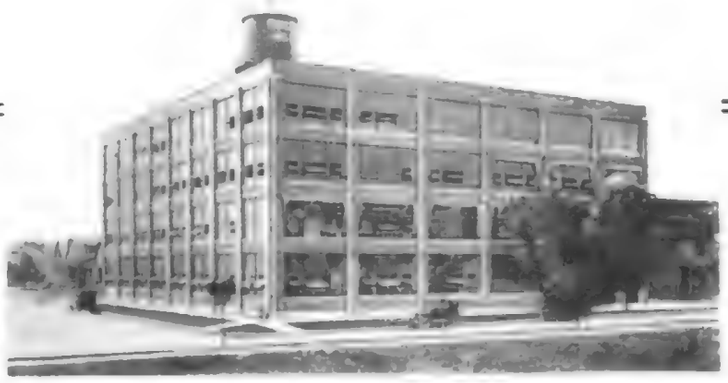
Whether your printing needs are ordinary or elaborate

THIS means more than just type setting and press work. It includes originating, compiling, editing, designing and engraving as well. We are even prepared to attend to addressing and mailing.

WARE BROS. COMPANY

1010 ARCH STREET P. O. Box 1403 PHILADELPHIA

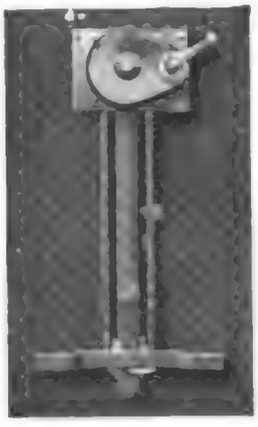
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View of plant where Ternstedt Closed Body Hardware is built.

Immediate Delivery on Closed Body Hardware

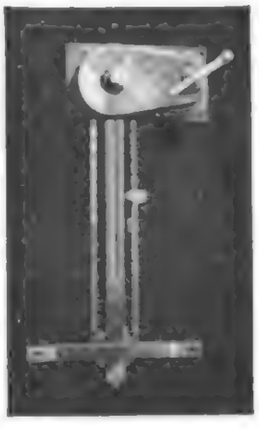
"When will I get delivery?" is, without doubt, the most vital question before the body builder today. **Delivery** ranks even prior to price. You can have delivery, however, on any or all Ternstedt products—at once—and at an unusually reasonable figure. Right now a six months' supply of necessary material is safely stowed away in our plant. Your requirements can be taken care of whenever you say the word. But say it quickly as our output is fast being taken up.



Ternstedt Standard Window Regulator

In purchasing Ternstedt Window Regulators and other Closed Body Hardware, you can feel certain that you are receiving full value for every dollar invested. Simply constructed, easily installed, Ternstedt appliances stand the gaff under any demand of service. You'll find Ternstedt equipment on practically all high-grade bodies next year.

Let us send you our new catalogue
It shows the entire Ternstedt line



Ternstedt Offset Window Regulator

TERNSTEDT MANUFACTURING COMPANY

ARTILLERY AND MUSTER AVENUES :: DETROIT, MICHIGAN

MANUFACTURERS OF

Window Regulators
Window Regulator Handles
Lever-Lock Handles
Anti-Rattlers

Door Bumpers
Windshield Wipers
Curtain Rollers and
Other Closed Body Hardware

At the Hotel Commodore, January 3-10, 1920

A display of the complete line of Ternstedt Hardware will be shown at the Hotel Commodore, New York City, during the week of the Automobile Show, January 3rd-10th, 1920. You are cordially invited to thoroughly inspect this exhibit. Some new ideas in Closed Body Hardware, which never before have been shown, will undoubtedly be of great interest to all body builders and engineers. Come in and see for yourself.

Motor Bodies and Parts

A Seven-Passenger Sedan

Mounted on a Studebaker Six Chassis

By GEORGE J. MERCER

The design here illustrated is larger than the conventional single compartment enclosed drive body. Ordinarily a seven-passenger body is a chauffeur-driven car, but there are enough owner-driven cars of this size to warrant an exclusive design. Also the feature of a division back of the driving seat is not insisted on by the purchaser as much as it was a few seasons back.

The wheelbase is 126 inches, with 33 by 4½ tires. The body design has been built around the distinctive features of the car, the engine, hood and fenders being retained intact. It is the combination of the cowl (which is a straight continuation of the hood line) and the slanting windshield line which gives this design its original feature.

It is altogether too common to see a poor and inharmonious blending of the slanting pillar and the cowl, viewed from the side and looking in the direction indicated by the arrow on the top miniature view. On the view illustrated, the junction of the pillar and the cowl is inside the side line of the body, or another way to explain is, that the foot or base of the pillar rests on the top sheet of the cowl, and the whole of the extension is divorced from the side line of the body forward of the front body lock pillar.

The Slanting Extension Front

Right here it is necessary to give a few facts relative to the conditions governing the slanting extension front. This will be old to body men, but the general public are not so well informed. First, the width across the front at a point corresponding to about the front of the door is governed by the necessary hand clearance between the framing and the steering wheel, this is illustrated on the construction top view. Second, the front of the door must come forward sufficiently so that there is a minimum distance of 7 inches between the corner of the seat and the front body pillar at the cushion height; more if possible. Third, the width of the dash is already established and to change this will mean a new engine hood; therefore if we are to retain the dash width, the body side line must be swept in rather quickly from the width established at the door to the dash. This can be accomplished easily on that part of the body below the belt line, but when the slanting pillar, which is a continuation of the roof sweep ordinarily, is brought down to meet the quickly changed line between door and dash it is bound to produce a bad corner unless the dash is more than ordinarily wide.

The top view herein illustrated is not one to which this criticism could be applied, as the dash width is ample, but even with the favorable conditions here offered, we prefer to carry the extension in from the side line. It also has the advantage of bringing the glass more at a right angle to the line of vision of the driver. The angle of the slant is less than when the older form of extension construction is used, and it looks better when the top of the side glass has 2 to 2½ inches in width, as here shown, in place of the sharp angle generally used. Also in this design the bottom line blends harmoniously with the hood line; both end at the body front pillar.

Form of Cowl for Present Styles

This form of cowl and extension construction fits in well with the present style of having the belt molding extend all round the body. The extension is formed entirely of wood framing, the pillars being framed to the cross bar as illustrated and the cowl metal is either turned up and finished under the horizontal moulding, or sometimes the upright part is welded at the corner to the cowl sheet. Either way forms a strong reinforcement to the framing without any chance of joints showing. The horizontal moulding has been a distinct advantage to body builders, as it simplifies the panel work; on the other hand, the flush door, which gives that smooth, unbroken surface to the body side, adds work to that part of the job.

One of the benefits of the horizontal moulding is that it gives a lighter appearance to the body, as well as adding the defined straight line. The drip moulding at the top goes all round also, and this permits the use of a laminated wood roof. As the side and back metal finish under this moulding and the roof cloth finishes at the same place, the drip will then cover the joint.

An explanatory note is necessary to correct the impression when looking at these small drawings. That is, that the mouldings at the center and top of the body must be curved slightly, at least one-quarter inch upward across the body ends, to make them look straight.

Outside hinges are used. Concealed hinges would throw the front door back when open so that the rear door could not be operated, unless a very wide pillar was used to separate them, and this is objectionable, as the upper frame work is wide enough even when taking advantage of every available condition. These hinges, of course, have the joints covered. The handles are the straight bar type, silver finish, the straight handle conforming to the straight molding.

This job is designed to have all the upper framework covered with metal. This costs more, but it is worth it because no one will take the time to properly paint wood to stand up and look equal to the metal surfaces of the rest of the body; and also metal work has progressed so much within the last few years that great things in metal are accomplished without any extra effort. Therefore all the outer surface of the body is metal-covered except the roof. The doors are flush and form their own covering for the joint by having the panel turned back over a strip or guide edge a few gauges thicker than itself. The door openings are large as well as the windows; the front door windows drop flush; on the rear doors the cut-out will prevent it going all the way down, and of course the quarter rear window stops at the wheelhouse framing. The back window is 13 by 26 inches and of course stationary. The door windows are operated by a regulator and work in straight grooves and do not jump the fence. The "jump-the-fence" regulator will cause broken glass at such unexpected times that unless one is ready to pay the difference it is best to use the straight run as here illustrated.

The Windshield Construction

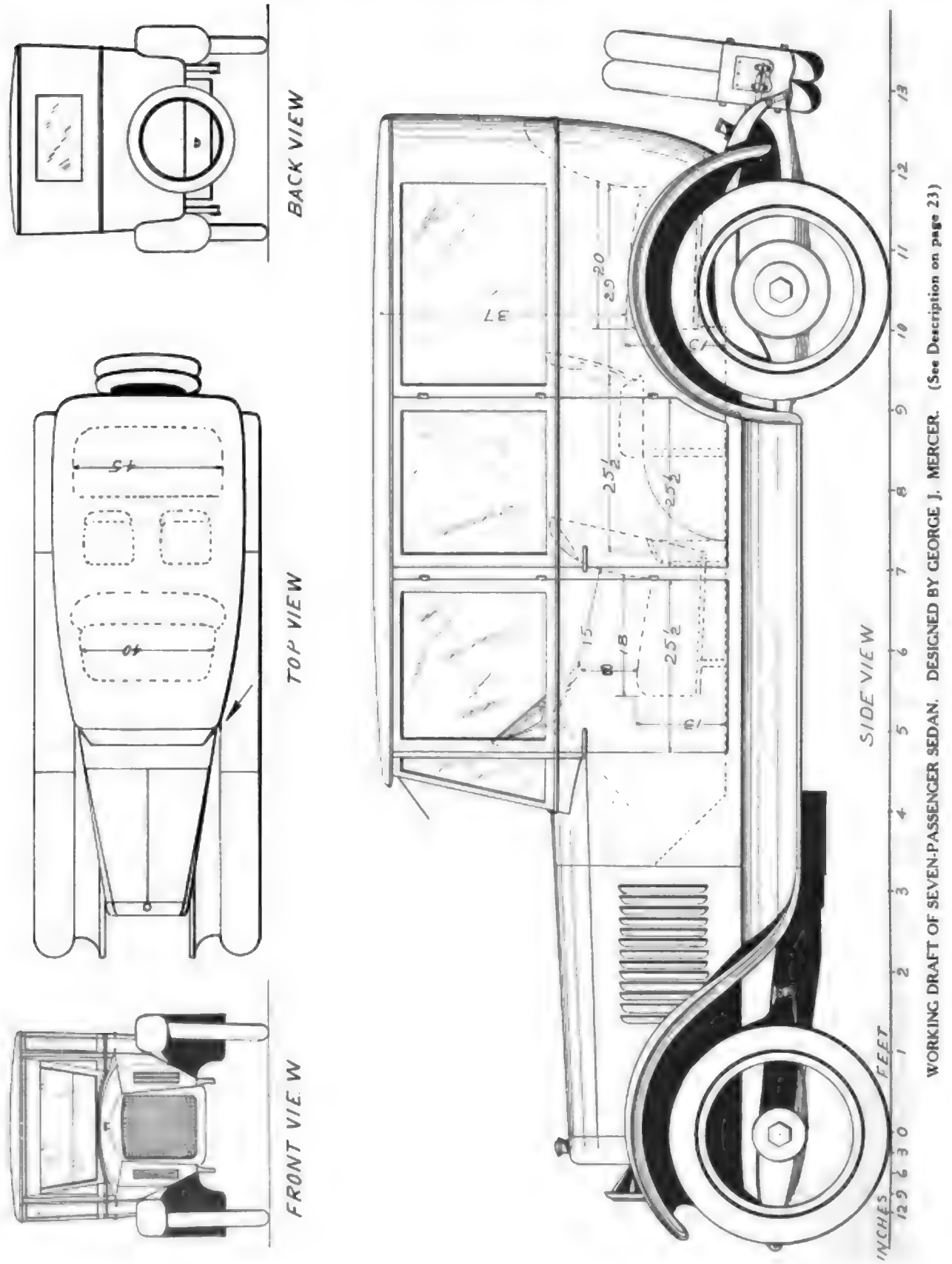
The rear quarter windows are operated by a strap and the front windshield is two pieces, both parts being made to swing, the upper outward and the lower inward, for ventilation. This type of shield is a commercial article and the lower shield sets over a fence to keep out the water. It stands to reason that a movable lower shield will permit some leakage, but the type now in use decreases this to a minimum. The upper shield operates with a ball joint, so that it is readily operated with any slant of the pillars, and is made by Jos. N. Smith Co., Detroit.

Outside the shield is an artificial leather visor. There are reasons for using a substitute for glass for the visor, one is that the leather keeps out the sun's rays and the second is that the price of glass today prohibits its use except where it is absolutely necessary.

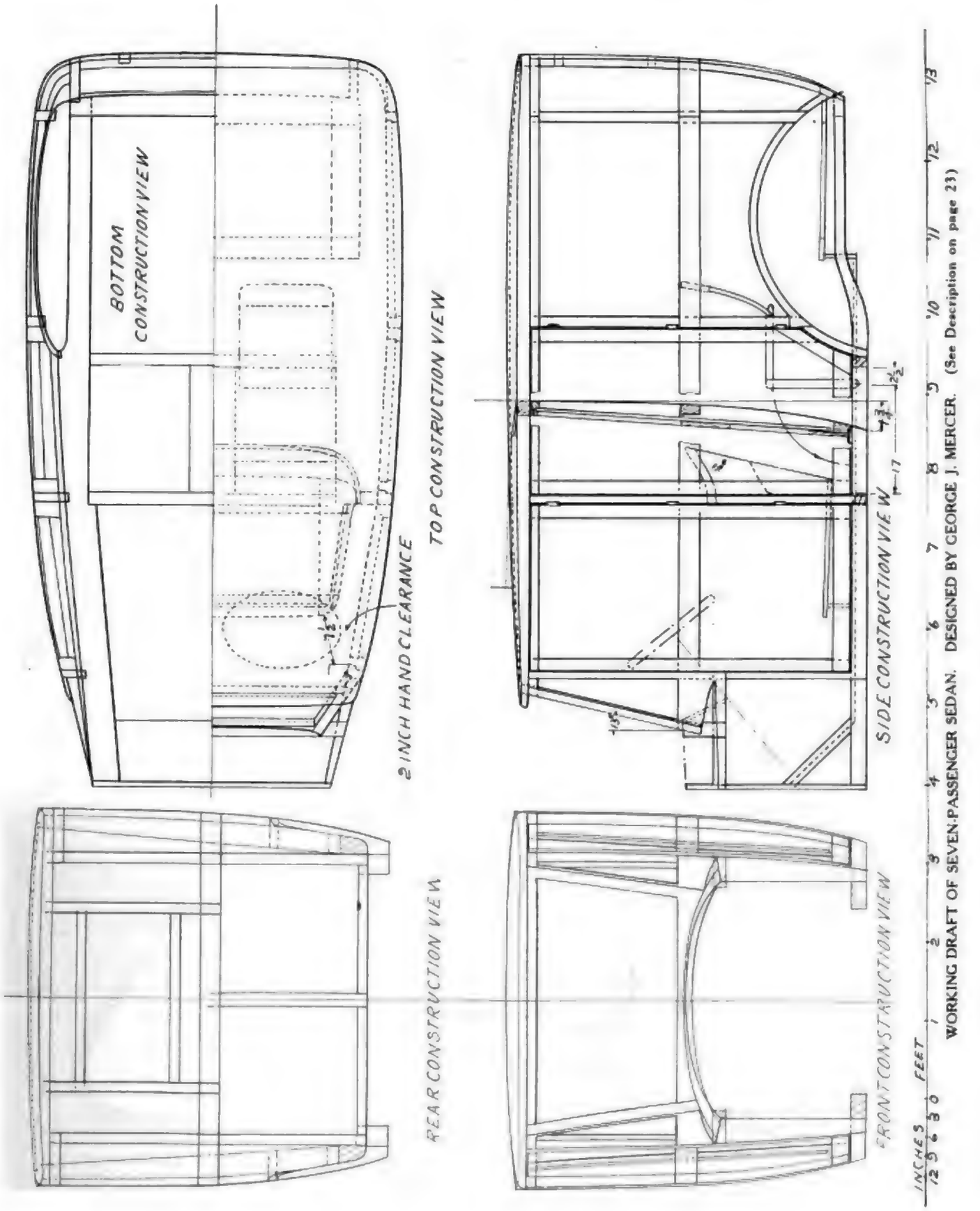
All the essential dimensions, giving the size of cushion and height inside are indicated by figures. The cushion sizes are very generous, while the height is the minimum for a large body. The auxiliary seat is the Amesbury type and folds flush into the back of the

(Description continued on page 28. Working Drafts, pages 24 and 25)

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WORKING DRAFT OF SEVEN-PASSENGER SEDAN. DESIGNED BY GEORGE J. MERCER. (See Description on page 23)



WORKING DRAFT OF SEVEN-PASSENGER SEDAN. DESIGNED BY GEORGE J. MERCER. (See Description on page 21)

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John C. Hills, Trenton, N. J.
Mercantile Novelty Co., Fort Wayne, Ind.
Wm. Stockdell, Louisville, Ky.

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A Seven-Passenger Sedan

(Continued from page 23)

driving seat. The framing sizes are standard and the scale is sufficient to determine any dimensions not indicated.

The bars as spaced back and front of the folding seats and indicated by figures are of dimensions that secure best working results for this seat.

The sheet metal is steel, 20 or 22 gauge. These sizes give good results when working and it is now general to make even single body orders of steel. Of course, aluminum will serve if it can be secured for the work, but steel sheets now made for this work are almost as good as aluminum except for the sheets with a curve, that is contracted, where aluminum must be used.

The hardware specifications call for 1¼ inch wide covered joint coach hinges. The locks are lever or rotary, with locking device and with outside key or right side doors, rubber bumpers and rubber dovetail for doors, perfection regulators for windows.

When using doors with locks equipped with locking device the customer should be warned never to set the lock when the door is open, as it is possible to slam the door and press the bolt over the first notch on the striker plate, where it will set and require a workman to remove the lock to release it.

Specifications for painting will be a decided dark color, preferably one or two-tone blue, and black fenders. The trimming material best for this design for service will be a wool fabric in which gray is the body color and fine stripes of either green, blue or black. The dome light, corner reading lamps, door handles and metal pull-to handles are silver finish. Toilet cases should be small and concealed, one each side; one vanity and one gentleman's set; rope robe rail to match trimming on back of front seat.

Trimming designs now are standardized to the straight plait and only special town cars or very large closed bodies use different than the above, as a rule.

The present time is not conducive to originating new designs in trimmings or appointments. The difficulty of getting material prevents extreme originality, when all builders are compelled to accept just such materials as the dealer happens to have on hand. Still, great endeavor is being exerted and much good can be accomplished if good workmen handle the job, even though the materials are limited from which a choice can be made.

Chicago's New Type of Motor Bus

Residents of Chicago were surprised recently to see on Michigan Boulevard a strikingly new type of motor vehicle—an omnibus with a covered upper deck practically enclosed in glass.

As a matter of fact the new bus differs but slightly in construction from those previously operated in Chicago. However, the difference, though slight, is tremendously important. It means comfortable seats on top despite cold winds, sleet, snow and ice, and more than doubles the seating capacity, thereby greatly increasing the earnings during bad weather as well as increasing the comfort of passengers, without appreciable increase in operating or maintenance costs.

Like the older type the new vehicle has the front wheel drive, the floor on a level with the curbing for convenience and speed in taking passengers on and off, and the covered straight stairway in the rear, which is safer than the winding and exposed one.

Instead of the twenty-five enclosed downstairs seats on the old style bus available in bad weather there are sixty, which means that had the newer style bus been in service from January 1 to August 31, 1919, instead of the old ones, 733,557 more passengers could have been carried, meaning an approximate increase of earnings amounting to $73,355. During that period of time the Chicago Motorbus Co. carried in its buses of fifty-one passenger capacity—twenty-five seats below and twenty-six above—4,106,208 persons on 58,027 round trips. When the company began business on March 25, 1917, it had nine buses and averaged daily 2,229 passengers. This number increased with the addition of more buses and with the growth of the motor bus idea of travel until in August, 1917, it was 18,034. The cost of operating this fifty-one-passenger bus averaged in December, 1917, twenty-nine cents a mile. Designers of the sixty-passenger closed-top car declare that the increase in operating cost is negligible.

The designers based their general ideas of construction on the old bus which in itself is radical when it is realized that all the other motor buses of its kind in the United States seat only forty-four passengers. Its length is 25 feet, 6 inches; the width 7 feet, 6 inches, while the height from the roadway when loaded is 13 feet. It has a wheel base of 176 inches. Height of lower deck from roadway 12½ inches; height of upper deck from roadway is 86 inches when loaded. Both decks are lighted by a generator driven by the engine, and the heat is supplied by deodorized exhaust gases from the engine.

The front tires are 6 inches single and the rear ones are double, with a total tread of 12 inches. The power plant is the A M B C standard type of front-wheel drive made into a detachable unit with constant mesh transmission. The brakes on the rear wheels are placed so as to be applied to approximately 500 square inches of braking surface.

However, the covered upper deck with its forty-one windows is the principal feature. Of course, this is made possible by the front wheel propulsion and consequent low hanging body enabling the cover to easily clear elevated structures under which it must pass. The Chicago company expects to install these vehicles as rapidly as they can be built. It is hoped to have a line of them running on the south side of Chicago by spring. Just at this time when the motor bus is coming to the fore as the most feasible means of city transportation the operation of this new type will be watched with great interest.

Runabout Bodies with Curved Surfaces, Their Design and Construction

(See Working Draft on next page)

One of the most difficult curved bodies to design and construct is the runabout; insignificant, apparently, as to appearance, but not easy to obtain the correct style and the flowing outlines composing the hood, cowl and body from front to rear end. And if the body must be rounded on rear end, with a raise of from 2½ to 3½ inches, it increases the difficulties in designing and construction to a considerable extent.

Many runabouts built in the past do not possess the correct composition nor the artistic outlines which they should reveal at a glance. All the parts of the motor body should be calculated and treated from an artistic viewpoint to create the flowing curves which attract attention at once, no matter what type of body is fitted to the frame. Correct outlines can only be obtained by a combination of the various views; that is, the points from side elevation must be carried to the plan which we call the top or bottom view, and to the front and rear elevations.

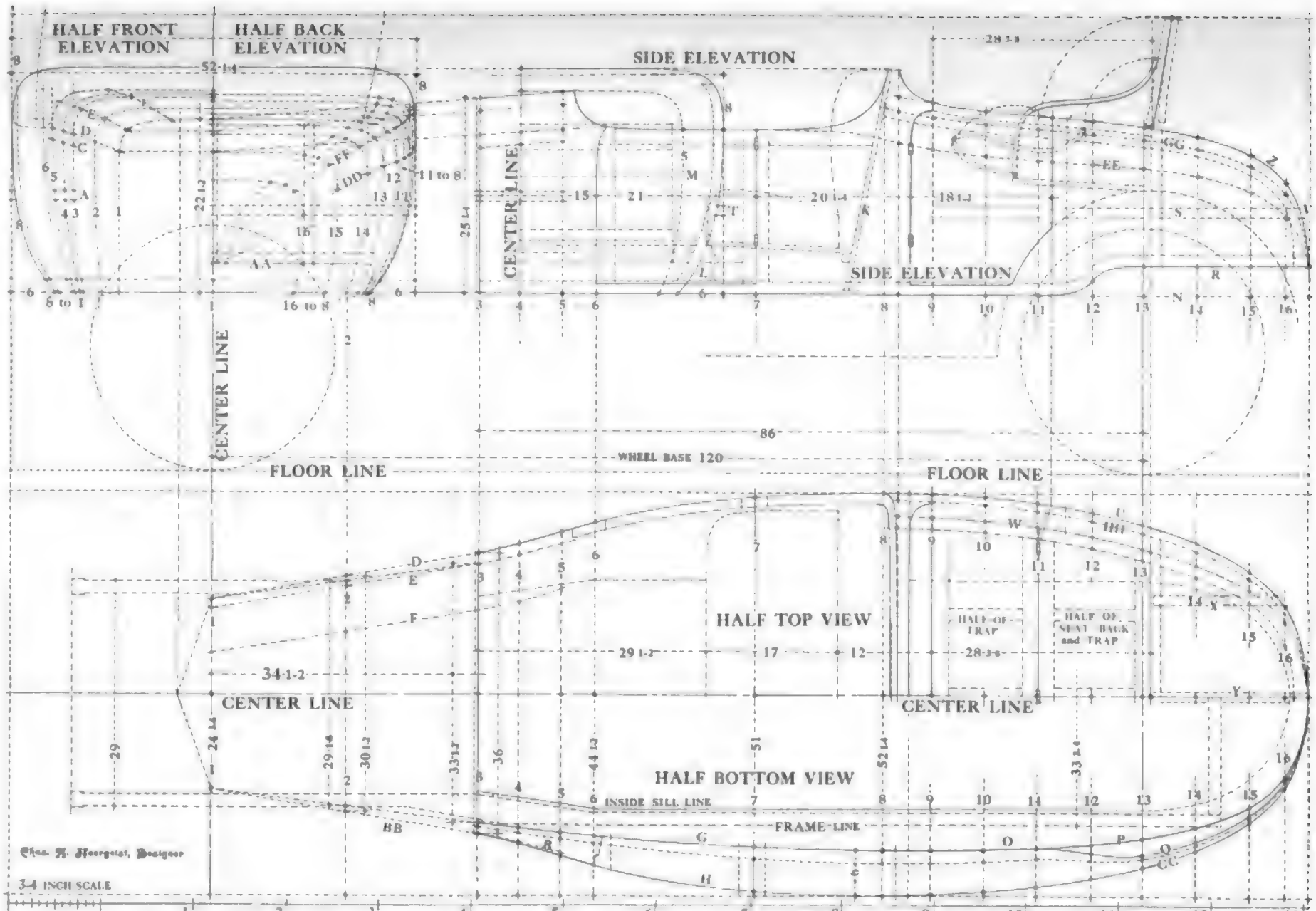
The layout of these lines on curved bodies so as to obtain all the needed curves for strainers, pillars and rails will be treated not only on this draft but also on the five drafts following, drawn to 1½ inch scale, or twice the size of our regular working drafts. For this reason the drafts had to be divided into three parts—front part, including the hood and cowl; the center part of body; rear part of body, each part containing all the information the draftsman and the practical body maker need to know.

Description of Hood and Cowl

The hood on this draft is 34½ inches long, 22½ inches high on front end, 25¼ inches high on rear end. The various widths of hood are as follows: Across front 24¼ inches and across rear end 33½ inches on chassis and 36 inches on widest part. The object is to produce a continuous artistic surface from front of hood toward the rear end of body, and especially at the rear end of cowl.

The shape of hood, cowl and part of the body can be obtained either in a horizontal or vertical direction, because the shape of the dash must fit the hood, and from the dash on cowl all the strainers may be fitted lengthwise. For instance, strainer A, half front elevation, is taken on side curve B, half bottom view, as shown by dotted lines.

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RUNABOUT OR ROADSTER BODY WITH CURVED SURFACES. (See Description on page 28)

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The strainer on C, half front elevation, is curved from the same line as B, half bottom view. On top of hood the strainers are straight, but if there is a curve on top of cowl, these curves must coincide with the shape of the cowl.

Lines D, E, F, half front elevation, correspond with lines D, E and F, half bottom view. Note the points and distances from center lines on both half front elevation and half bottom view and you will find that they coincide with each other. When this is done always note the figures from 1 to 5 on side elevation, half front elevation and half bottom view for points on hood and cowl. These figures are decidedly necessary when points and widths are taken from one to the other of the various views.

Because the half back elevation is drawn directly into the side elevation of the hood, on account of its limited space for a ¾ inch scale working draft, and because this subject is one of the greatest importance in body building, this part is redrawn to 1½ inch scale on the following drafts and explained in all the details needed in the construction of automobile bodies.

The front part of body containing the cowl, door and seat, is 15 inches long from rear of hood to front door joint; width of door 21 inches and the space between front hinge door joint to rear hinge door joint is 20¼ inches. These three dimensions may vary, as they depend on the length from rear of dash to rear center of wheel. The dimensions for leg room are 29½ inches and depth of seat below the cushion is 17 inches as shown on half top view.

Half of the elevation is drawn directly into the side elevation as is done in practice and the body has 6 inch turn-under as shown. Note lines G and H, half bottom view; line G is the bottom curve of the body and H the top curve, and both are connected with the hood on dash or rear end of hood. At this point or sectional line 3 the body has 1¼ inches turn-under each side, and at 8, 6 inches, consequently the body has different amounts of turn-under from 3 to 8.

The front part of hood 1, is square up and down; 2 has ⅞ inch turn-under each side, and at 3 the body has 1¼ inches under each side. The same is done from 3 to 8. These same widths on lines G and H from 1 to 8 are carried over to half front elevation, which gives the shape and amount of turn-under by shifting the pattern.

When fitting the door standing pillars to the sills, they must be in the exact position vertically, and must meet side curve H, half bottom view. It is well to take the widths when the body is set up and also in an angular direction.

The back of seat K, side elevation is made of ⅞ inch thick ash, 7 inches wide, with a piece 3½ inches wide between for the springs to rest on. This back-rest is framed into the sills at the angle as shown on side elevation. The heavy top line is the top line of back and the heavy line L, side elevation, is the turn-under line on the widest part of the body. Because back K is inclined, these side pieces must be beveled a trifle. To obtain this bevel cut the lower end of the side pieces square across the body and bevel to inclined line K lengthwise, and then square across piece K. After this put the turn-under pattern to the square line, top and bottom, and mark the amount of turn under.

Dotted line M, side elevation, represents the top and turn-under curve of front door standing pillar on vertical line 5, showing that the upper outer edge of body runs into the vertical line on top edge. In practice all the lines from 1 to 7, half front elevation, are drawn into that view, and the half front elevation on the left is omitted.

The Rear Part of the Body

The rear part of the body is constructed with a door on each side, a disappearing seat, which is hinged to the body, is folded toward the inside and the open part is covered with two lids. The main part of the lid forms the seat-back and the other part is hinged to the main lid and rests rear of seat-back when open, as shown on side elevation. This rear part is raised 4 inches above the main top line of frame and all the curved top lines are alike, but all the turn-under lines from front to rear end have different curves. At rear end the body is rounded from the top and the two sides, and the strainers must be designed to fit these curves. If the frame is made without a raise the bottom edge of body would be at N, side elevation and the widths of body would be at line O, P, bottom view, but if there is a raise of 4 inches with an amount of turn-under of 6 inches, line Q, bottom view, must be used. This line Q is obtained by deducting the amount of turn-under at the height of four inches on the horizontal line R, side elevation.

The curve and bevel of rail S, side elevation, is obtained by deducting the amount of turn-under at T, side elevation, from curved line U, half top view. At the rear end of the rail the bevel is just the opposite from T, side elevation. To obtain the correct bevel put the bevel on rear end of body and on the sides of the turn-under pieces, and then use the pattern, which must be specially made to suit the curve, the curve U, half bottom view, does not fit the curve of the rail.

Attention must also be given to space U, side elevation. That is, the rail S must be that much shorter than the length of sill at center of body. Heavy line W, half top view, is the lid and door joints, the doors curve around the corner up to the lid joint W. To make it easy for the body maker a rail fitted to the side pieces is framed to the sills at 13, side elevation, according to the curve 13, half back elevation. Into this piece is framed piece X, half top view, and another at center of body Y, half top view. The piece Y has the same shape as curve Z, side elevation, and is dressed square, but piece X has a different shape, is beveled to conform with the side curve of the body and with the cross piece on line 13, half back elevation. The shape alone is of the most importance, which will be explained on the drafts drawn to 1½ inch scale, as this working draft is too small to show the system of obtaining all the curves, bevels and points.

To establish the half back elevation the widths across must conform with the lines and points on the other views. To make a success of constructing working drafts the draftsman should know at once where the various pieces start and end, no matter whether they are contracted or inclined. There are pieces on the body that are inclined in two different directions, and contracted, but the draftsman should know where the pillar or post should be at the requisite height. In all cases the contracted post will change the position on top. This also holds good with the inclined pillars or pieces and all must be lengthened to the amount of inclination and contraction.

On this draft the draftsman must know the width of the body at each sectional line. The vertical sectional line 8 is the widest part of the body and half front elevation shows the turn-under lines from 8 to 1, and at the same time shows the curve and upper shape for each. These same lines are shown on half top and half bottom views. The same rule applies to half of back elevation, the widths run from 8, the widest part, to 16 on side elevation, top and bottom views, and from 16 to 8 on half back elevation.

These figures on base line of body, cowl and hood, conform with line G, O and P, half bottom view. Line Q, half bottom view, represents line A A, half back elevation. All the outside widths of the body, half bottom view, on B B, hood, and cowl, H the central part of body, and C C the rear part of body, are found on the widest parts of turn-under lines from 2 to 16, on half front and half back elevation. Points D D, half back elevation, represent the widest part of the body at each sectional line from 8 to 16, and this same line D D is shown on E E, side elevation, and also shown on curved line U, half top view. Again line F F, half back elevation, represents line G G, side elevation, and H H, half top view. These points are simply squared from side elevation to half front and back elevation, half top and half bottom view, and the widths across transformed from one point to the other.

This system of obtaining the points, and through the points the correct curves for any rails or strainers on a curved body, will be explained more fully on sections of runabout bodies following the description of this working draft.

Record making strides are being made in the construction of the new units in the $1,000,000 building program of the Franklin Automobile Company, Syracuse, N. Y. Possession has been given of the ground floor of the new half-million dollar manufacturing plant on the site of the present works. Two months ago the site was a vacant lot. Now the company has possession of one floor and the building is nearly completed. It will be seven stories high.

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Designing Hoods and Cowls for Automobile Bodies

When automobiles were first used the hoods were separated from the body, the dash separating the two parts completely. The carriage dash was so much of a feature of the old carriage body business that the builders of automobile bodies could not get away from it.

The first indication of change in this direction was recorded in January, 1912, by an automobile body engineer, returning from Europe with the Society of Automobile Engineers, who said: "The flush sided body and the sloping hood seem to have the predominance of favor among all European manufacturers, and it is interesting to note how the various designers are going at it. England has led in the development of the flush sided types and France seems to be the last one in line. This may be due to a small amount of "pique" because the French designers do not like to admit that they are following any others.

"In Germany everything is flush-sided and the Germans are also carrying the matter of the 'scuttle front' to the extreme. One of the most popular types now seen in Germany has a scuttle to both the front and rear seats, the back of the front seat being developed into a scuttle design.

"It is interesting to note the development of the artistic. The French designers are all for graceful and consistent design with the body lines developed to give the fullest harmony of outline and balance of proportion. In England, the whole idea seems to be utility and practicability.

"Every once in a while the sloping type of hood crops out unexpectedly from some old line designer, and even on the water-cooled cars that still put their radiators at the front of the chassis, there is a tendency to slope the hood from the dash down to the radiator; in fact, a great many designers think this sloping type of hood is the only right type."

From the above it is to be understood that German builders introduced the flush sided bodies and at the same time removed the dash which separated the hood from the body and continued the outlines of hood to cowl and body. The French very soon adopted the new lines, but added the artistic and refining touches seen on most of the French cars, which gave the bodies a distinctive appearance not possessed by those of other nations. The sloping hoods did not agree with American designers; they had been accustomed to allow very little drop. It took several years to change the styles in this country, for production work, to correspond with those built in Europe in 1912 and 1913, but when the change occurred it was done almost in one season. But many of the changes were not satisfactory and the twisting of the cowl on account of the narrow hoods on dash line could not be avoided until the hoods were increased in width at dash to suit the widths of the

Our foreign designs published in the January number of THE CARRIAGE MONTHLY, 1913, show the trend of the changes in hoods and cowls.

The Cunard Motor & Carriage Company, Ltd., London, retained the upright finish of dash and cowl but used the upper horizontal line on hood as made by the best concerns in this country at present.

The Austin Motor Company, Ltd., Northfield, near Birmingham, England, used the upright dash and the horizontal hood line on former styles.

Angus, Sanderson & Company, Newcastle-on-Tyne, used the upright dash and horizontal hood line.

Snutzel Frères, Brussels, Belgium, used the upright dash and horizontal hood line.

D'Ieteren Frères, Brussels, Belgium, used the slanting hood and obliterated the dash line.

All the designs we received at that time from Karl Trutz, Carrosserie Neuss, Berlin, Germany; Kuhlstein-Ruhe, Berlin, Germany; Daimler-Motoren-Gesellshaft, Germany; Chr. Auer, Otto Naegele and almost all the other German manufacturers had the dash effaced on their bodies.

Carrosserie Audinau et Cie., Paris, was one of the first builders to get rid of the dash in France; Austin Motor Company, Ltd., England, and Argylls, Ltd., Alexandria, Scotland, were among the first to do so in Great Britain.

At the same time (1912-1918) the Société Francaise D'Automobile, Paris, used the V-shape radiator and effaced the dash line; the Fiat Automobile Company, Turin, Italy, and Poughkeepsie, New York, and the Holbrook Company, New York, building bodies for Packard Motor Company, effaced not only the dash line, but also used the horizontal dash line. But the hood was narrow across the dash line and the cowl had to be considerably contracted and twisted to meet the width of the hood at dash.

The above give the changes correctly, as illustrated and recorded in THE CARRIAGE MONTHLY of that period.

Detailed Explanation of Working Draft Containing Hood and Cowl Only

The top line of side elevation and hood on this working draft are almost in a horizontal direction, dropping about 1 inch only in the length of hood and cowl. In this draft we will show how the curved outlines of hood and cowl (called "scuttle" in England) are made. This method of obtaining the points and curves for hoods, cowls and bodies, as shown, is the easiest and most correct method when the hood and cowl are combined. For this very reason the shape and widths across the hood should be designed by the body engineer and not by the chassis engineer, as it is generally done.

The shape and widths of the hood are sometimes in such a state that it is impossible to combine the hood with the cowl and body to produce an artistic combination of the two, or as the body engineer of the Society of Automobile Engineers put it: "The French designers are all for graceful and consistent design, with the body lines developed to give the fullest harmony of outline and balance of proportions."

The heavy outlines to the right on top of this draft represent the shape of hood and cowl on side elevation; and the heavy outlines on half front elevation represent the curved outlines on front end and rear end of hood.

To proceed with the design and style of body, including a consideration of the working draft, it is decidedly necessary to have the shape and all the dimensions of the hood as shown on heavy lines 1 to 4, half front elevation. Dotted lines 2 and 3, half front elevation, can be dispensed with on this hood, because they are straight on each side, but when they are convex or concave they should be made as shown, to produce the exact shape.

It is not necessary to produce the same shape as heavy lines 1 and 4, as long as there is a true outline or more or less curve, as on some bodies more or less curve is needed and the hood should conform with the cowl and body.

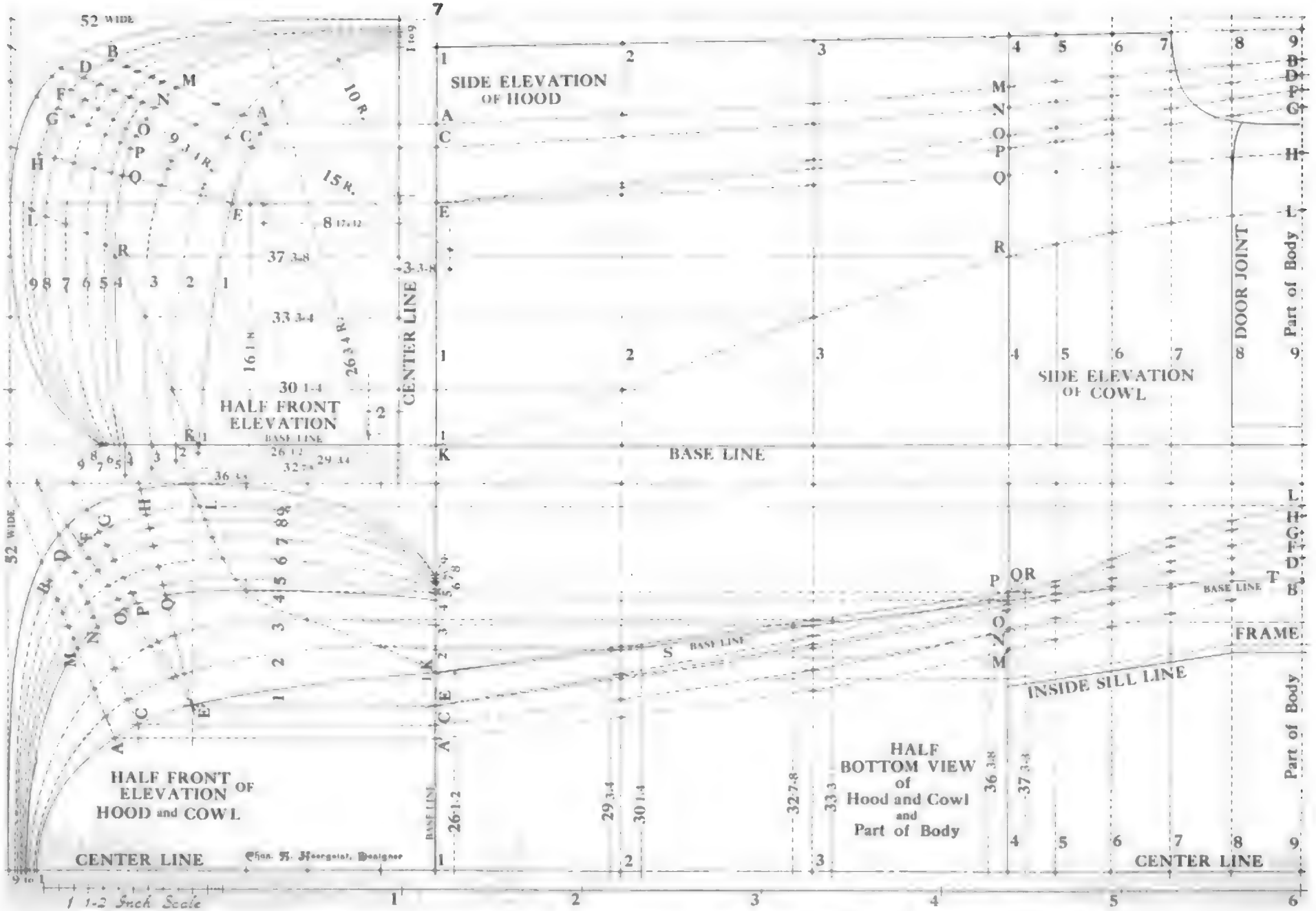
In our former working drafts on a smaller scale we have shown dotted lines C E and D F only, and sometimes curved them, but it is easier to make them straight on half front elevation and curve them if needed on side elevation and half bottom view.

We also want to show at the same time that those lines can be made in any direction, as shown on A B, C D, E G and E H, half front elevation. On this draft the half front elevation is drawn directly in front of side elevation of hood, so that the points can be squared directly from side elevation into half front elevation or the reverse. The same is done with half bottom view and the half front elevation is placed in such a direction that all points can be squared from half bottom view to half front elevation of hood and cowl or from half front elevation to half bottom view. This system is the simplest, most correct and easiest to adopt and should be familiar to all designers, draftsmen and body builders.

After the side elevation of the hood has been drawn, as shown in heavy lines on the four sides, giving length, height of front end, height of rear end and consequently the amount of slant, make the sectional vertical line as shown on this draft from 1 to 9. These sectional lines can be made closer together or farther apart. If curved line 1 and curved line 4, representing the shape of hood on half front elevation, are made as drawn in heavy lines, either by the chassis engineer or body designer, make line A B, half front elevation. Point A represents the front edge of hood, M the rear end of hood, and B represents sectional 9 on side elevation of body, rear of door joint. Now we have three points which are carried over

(Continued on page 33)

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WORKING DRAFT OF RUNABOUT OR ROADSTER BODY, SHOWING HOOD AND COWL ONLY. (See Description on page 31)

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Designing Hoods and Cowls

(Continued from page 31)

horizontally into the side elevation of hood, or in other words squared over from points A B and M, half front elevation to points A M B, side elevation.

Point A, half front elevation, is squared over to point A, side elevation; point M, half front elevation, to point M, side elevation; point B, front elevation, to point B, side elevation of cowl and part of body, representing sectional line 9. Make a slight concave line on hood and a slight convex line on cowl and body from points A to M and B, meeting the three points on side elevation of hood and cowl.

Do the same with points C N D, half front elevation; carry them over horizontally to points C N and D, and make line from C N to D on side elevation of hood, cowl and part of body to vertical line 9 following in the direction of A M B, because these two lines are parallel on half front elevation. Do the same with E O F and E P G, half front elevation, and carry points E O F and E P G into the elevation of hood, cowl and part of body. Make lines from point to point; starting at point E on 1 and ending on the six points E O F and E P G, side elevation of hood, cowl and part of body. Do the same with E Q H, half front elevation, to F Q H, side elevation. The operations are always the same.

Curved line K 1, R 4 and L 9, half front elevation, represent the full widths of hood, cowl and body on side elevation K 1, R 4 and L 9. Square these points over to K 1, R 4 and L 9, side elevation, and make concave-convex line from point to point as shown on side elevation.

Draw half of bottom view of hood and cowl; take all widths from half front elevation above. In body makers' practice the half bottom view is drawn in connection with the side elevation, half front elevations being drawn afterwards, and all widths and points for front elevation are taken from side elevation and half bottom view. The same can be done on this draft. By making both front elevations exactly alike and by turning them as shown, all widths and points can be squared from half bottom view into the half front elevation or from the half front elevation into the bottom view; same as explained above.

The heavy line K 1, R 4 and L 9, half bottom view, represents the extreme outside widths of hood, cowl and part of body. By squaring these points over into the half front elevation we have point K 1, R 4 and L 9. Heavy line S, T, half bottom view, represent the base line of hood, cowl and part of body, and again these points K 1, R 4, 5, 6, 7, 8 and L 9 are squared over to base line on half front elevation. Square point E, half front elevation, to point E, half bottom view; also all points from E O F, E P G, E Q H, half front elevation, to half bottom view and starting lines from point E to Q, H E to P G, and point E to O F.

Do the same with the two parallel lines A M B and C N D, half front elevation, and carry them over to points C N D and A M B, half bottom view. Note that all the points and lines or widths across crossing each other at each point. For instance: Point E to center line, half front elevation, and point E to center line, half bottom view, the distance is alike, because the point E on half bottom view is obtained by squaring it over in a horizontal direction. Again, take distance from center line to point Q 4, half front elevation, and carry it over to point Q 4 to center line, half front elevation, on which the distance is the same. Measure from any point in the various views and compare them with each other if taken on the same number of sectional lines on side elevation and bottom view and curved lines on half front elevations, noting at the same time the lettering on straight and curved intersections. All lengthwise dotted lines A C E I, and B D E G H 9, half bottom view, if not straight they must have a correct curve, either convex or concave or convex-concave. The same on half bottom view representing the same lines. If one line is a trifle out of position on front elevations it will show plainly on the lengthwise dotted lines, on side elevation and half bottom view.

For instance, note points on K 1, 2, 3, R 4, 5, 6, 7, 8, L 9, side elevation, produces a correct line; for this reason, while all points are obtained by intersections, very good judgment is required to establish all the lines on side elevation, half bottom view and half front elevation.

We have been illustrating and explaining this method of intersection to obtain the needed points in making the curves on hood and cowl to correspond with the shape of body for several years, but the method has not been entirely understood by body engineers, designers and body builders. For this reason we have enlarged the scale to over twice the usual size and have divided the body into three separate parts: Side elevation and half bottom view of hood and cowl, including the two half front elevations; side elevation and bottom view of center part of body and entire cowl, including two half front elevations; side elevation and bottom view of rear part of body, including half back elevation.

There are two different styles of bodies; one lays flat on the frame and is rounded on sides and from top down, the other is rounded from bottom up, including top and bottom. These drawings show on all of them how to obtain the points and curves by the same system.

From a body builder's viewpoint this method of sectional divisions and intersections to obtain any desired point on hood, cowl and body is very interesting and labor-saving, which can be done with an exactness not obtained by any other method. The French use a different method to obtain the same points, but it is not as easily understood.

Death of Peter Kettenring

Peter Kettenring, founder of The Defiance Machine Works, and the best known resident of Defiance, Ohio, passed away at his home on October 8th.

Peter Kettenring was born in Bavaria, in 1836 and was, therefore, 83 years old. When he was but three months old his family moved to America, and in April, 1844, when he was but 8 years of age, settled in Defiance, Ohio, where he has since made his home.

While still a boy in years Mr. Kettenring started his life's work as a molder in a little shop on the canal bank at what is now the corner of Perry and Third Streets and the site of the present office building of the splendid establishment which he founded and of which he was president up to the time of his death.

In 1856, at the age of 20, Mr. Kettenring became one of the owners of the little foundry which was the foundation of his fortune and from which, through the remarkable foresight with which he was gifted, he developed the institution which has been the backbone of Defiance's prosperity and which has won for itself an enviable reputation that is world-wide in its scope.

Thirty years ago, in 1889, Mr. Kettenring's three sons, who had been carefully trained in different departments of the business, became a part of the organization and have since played their part in the development of the business. The eldest son, William A. Kettenring, died on May 1st, 1915, but Ranscom P. Kettenring and Charles H. Kettenring, the other two, are still actively associated with the business.

Founded Defiance Machine Works

Mr. Kettenring had led an active life, always having something worth while to do. He enjoyed excellent health and took a very vital interest in life and his business up to within a very few days of the end. Even old age made but little impression upon his rugged constitution until about a year ago when nature asserted herself, the organs of life began slowly but surely to fail in their functioning and this aged man, with the satisfying knowledge of a life well spent and nothing to fear from the grim reaper went quietly and peacefully down into the valley of the shadows knowing confidently that he will emerge from there into the realms of light and life everlasting.

Mr. Kettenring was a lifelong member of St. Paul's M. E. church of Defiance, Ohio, also a member of all the Masonic bodies of both Defiance and Toledo. He was a charter member of Defiance Commandery No. 30 Knights Templar, of whom there are now but three left, and he belonged to the Scottish Rite bodies, as well as the Mystic Shrine in Toledo.

Charles J. Partello, an instructor in the training school of the Franklin Automobile Company, Syracuse, N. Y., and director of the Franklin Band, one of the leading musical organizations in the city, has composed a march, arranged for band, which he has dedicated to the automobile industry.

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The Vehicle Monthly Course in Drafting and Construction

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Part E—Lesson 30. Contracted Panel Seats

(Continued from pages 36 and 37, November, 1919, of "The Vehicle Monthly.") (For description see page 38.)

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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Heergeist, Technical Editor and Draftsman of "The Vehicle Monthly."

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Subjects Treated in Previous Numbers

Part E—Lesson 1—Laying Out a Plain Board Seat
Part E—Lesson 2—Framing a Four-Cornered Seat
Part E—Lesson 3—Framing a Round-Cornered Seat
Part E—Lesson 4—Laying Out and Framing a Two-Passenger Seat
Part E—Lesson 5—Laying Out and Framing a Twin Seat
Part E—Lesson 6—Constructing Round Cornered Seats with Stripe and Boards
Part E—Lesson 7—Constructing Round Cornered Seats with Horizontal Joints
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Part E—Lesson 26—Obtaining Shape of Panel on High-Back Seat
Part E—Lesson 27—Straight and Convex-Concave Turn-Unders
Part E—Lesson 28—The French Method of Laying Out Square-Cornered Seats
Part E—Lesson 29—Non-Contracted Panel Seats

BACK NUMBERS CAN BE HAD FROM THE PUBLISHERS.

Part E——Lesson 30
Contracted Panel Seats

(For Working Draft see page 34.)

Explanation. Fig. 30. The laying out of this diagram is similar to Fig. 29, except that one side of the seat is contracted. This illustrates the difference in the construction of the diagram, compared with the non-contracted seat shown on lower part of bottom view.

Points A B, connected with a dotted line, bottom view, represent the outside top edge of seat on side elevation when horizontal. To obtain the outside base of seat on bottom view take space from point C to point D and carry it from point A to point E on front end, and on rear end from point B to point F, bottom view. These two contracted lines A B, and E F, must be parallel with each other, because the top and bottom edges of side elevation is horizontal, as shown by the dotted horizontal line; but the heavy line G H indicates that the top edge of side elevation is out of horizontal and lower on front edge. This difference of inclination is shown on points I J, and is carried over to bottom view from point A to point K. Connect point K with point B, bottom view, representing the top edge of side elevation when seat is lower on front edge, or out of horizontal. Connect the two angles on points B and L to point M, bottom view. From these points the back elevation can be established.

Take length from point A and point E to center line, bottom view, and carry it over to back elevation from center line to points N and O for front end of side elevation.

Then take lengths from point B and point L, to center line, bottom view, and carry them over to back elevation from center line to points P and Q. Note the difference in the construction of the diagram. Diagonal lines from points R S, R S, bottom view, represent the angles of the non-contracted seat, crossing the center line at point T and creating a difference in space from points M to R, bottom view.

Connect points N O, N O, back elevation, down to base of diagram; these lines cross at center line on point U. Connect both points P and Q, back elevation, crossing the center line at point U. The distance from point M to point R must equal that between points V and W on base. By this method the top and bottom corner on rear end of side elevation pass through the level side surface of side elevation, as shown by the two parallel lines A B, E F, on bottom view.

The Change Created by the Contracted and Inclined Surfaces.

All side elevations when contracted and inclined must be lengthened to the amount of contraction and inclination; the shape of side elevation on the four corners is also changed. Set dividers on point L and from point E, bottom view, draw circular up to base line. The same from point B to point A, bottom view. Lay triangle on line and points A B, bottom view, and draw line perpendicular from A B to point X. Draw vertical line from point X, bottom view, to point Y, side elevation. Connect point Y with point Z, representing the rear end corner when the seat is contracted after line A B, and inclined after N O, back elevation. The same is done on front corner of seat, but starting from the lengthened contracted lines, creating points 1 and 2, bottom view.

These two lines B, X, and 1, 2, are reversed on bottom view so that they can be squared up into the side elevation. Note the effect on the front end, throwing the square line into the inclined position. This is best shown by cutting a block in a vertical direction on front end and square with center line across.

Same problem as Fig. 29, except cut one side of the block square lengthwise top and bottom when horizontal and the other side contract after line A B, bottom view.

PART E—LESSONS 31 AND 32 WILL APPEAR IN THE JANUARY NUMBER OF "THE VEHICLE MONTHLY"

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Painting and Finishing

The Busy Automobile Paint Shop During the Winter

It is not always possible to keep the paint shop at top speed during the winter months; at times it seems quite impossible, as a matter of fact. But so far as business thrift, industry, politeness, advertising ingenuity and personal solicitation are equal to the task, the paint shop should continue right through the cold months to be a hive of industry.

At this time the car, or many of them, can be taken in for the heaviest painting and varnishing repairs; plenty of time, as a rule, can be taken to make all the processes right and wholesome and ample enough to develop a finish to be proud of.

To be sure, the car owner may be a little averse to having the work done at this time, but usually if he is shown that it is to his advantage, financially and otherwise, to have the work done at this season, you may have the car for the asking.

Many painters are slow to make a personal canvass of the community for the automobile work needing to be done, but it is a business proposition just in the sense that any business must be forced at certain seasons in order to keep things moving.

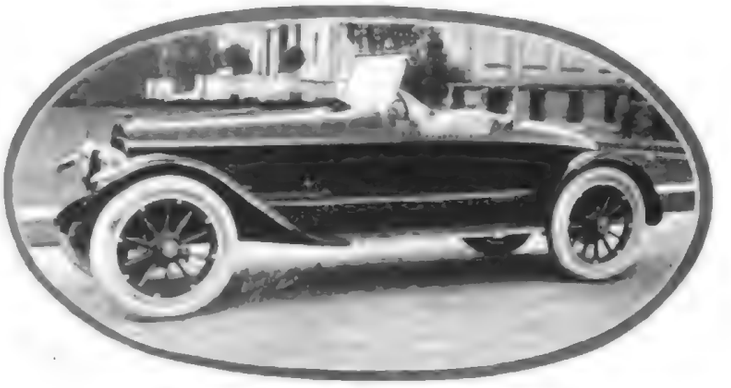
Personal solicitation, the "get-acquainted" habit, is a most moving method of developing business. It is second only to local newspaper advertising in its merit and capacity for getting results. Both classes of means for making the bigger and busier business need to be pushed at this time for all their worth.

It does not pay to let the shop get as quiet as the country graveyard during the days when the winds are blowing at a 90-miles-an-hour clip, and zero is bowing good-morning to the milkman.

All hands need employment in winter, and if the shop can be made to keep everybody busy at a good profit to all concerned the business takes on a new importance. Moreover, it will enable the owner or manager to clear up some otherwise heavy spring work coming along at a later time. If anything, such work can be done at a little discount in order to keep the machinery moving.

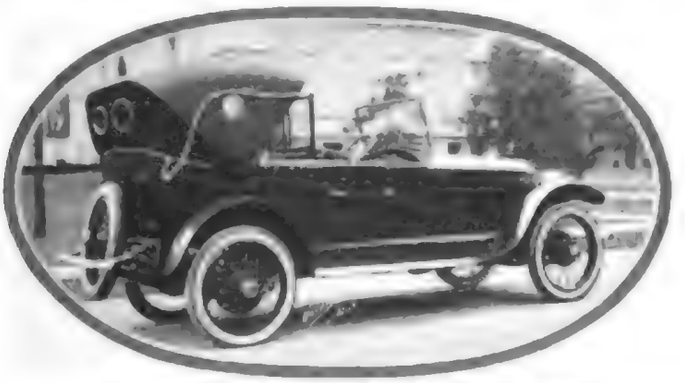
There is an additional advantage in having the shop working during the winter. The force of painters employed during the summer may have proved a most excellent one, in which case it is direct financial gain to keep the men working and contented; for the most part, these men will render better service next season for having been afforded steady work during a season when work is more than ordinarily scarce and hard to get.

So far as practicable, it is good business to get in the cars having need of the heaviest class of painting and varnishing repairs. They are in the way when the rush is on in the spring.



A CUSTOM-BUILT ROADSTER IN GREEN.

This job, mounted on a Peerless chassis, is trimmed in a smooth green, dull finished leather, and painted in a special green color. Wide striping runs along the bevel of the edge on sides. The knock-down rail shown in the photograph pushes down into the body. All mountings nickeled. Body built by The A. H. Gabel Co., Inc., Rochester, N. Y.



A VICTORIA TOP TOURING CAR IN GREEN-GRAY.

Car painted in green-gray throughout, with no striping. Entire body upholstered in green cloth with blue stripe in same. Carpets front and back to match. All mountings nickel. Chandler chassis. Body built by The A. H. Gabel Co., Inc., Rochester, N. Y.

Keeping Wash Leathers and Sponges in Order

In earlier years there was always much advice tendered in connection with keeping the wash leathers and sponges in order and capable of doing good work. Probably a great many of these bits of information fell upon stony ground; again, some of it fell upon good ground. As a result men of the paint shop in these later years have come to regard these tools as indispensable and to know much better how to take care of them.

It was once deemed destructive practice to wash the leathers and sponges in a solution of soap and water; today this plan is considered a wise one and is followed by most of the expert surface workers in the vehicle painting trade.

The chamois skins, or wash leathers, as perhaps they are more correctly termed, become dirty and saturated with enough foul accumulations to breed disease in the course of a few weeks' active employment.

While rinsing them in clean water does considerable towards cleaning out the accumulations, it will become necessary to give them a more thorough cleaning from time to time.

Soaking the skin over night in a weak soap and water solution will usually loosen up and set free the dirt and foulness so that in the

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morning one has simply to squeeze the skin and pass it to a second container holding a still weaker soap and water solution in which with some manipulation and rubbing the leather speedily becomes clean. With a rinsing in clean water, or possibly taking it along through a couple of fresh water supplies, the skin emerges clean and fresh and supple and fully capable of doing even better work than when new.

The chamois skin of today is scarcely ever anything else than a western sheep pelt, hence the common habit of calling it a wash leather. These sheep hides are of course far from what the original chamois skin was when it came to the painter in its prime from over the sea, but with good care and treatment they may be developed into a skin qualified to produce most satisfactory results. They should be kept clean, in the first place; in the second, they should have extra good storage quarters -dust and dirt free containers.

After use the skin should be rinsed out in clean water and squeezed just enough to start the water and moisture from them. Then with a second rinsing in clean water they will take a sharp wrench to free them from the water, after which they will need to be laid away in the dry storage.

Sponges will need also to be kept clean; the sponge never thrives on dirt. It is always at its best in a clean state; hence wash often in soap and water and store in clean quarters.

The cheapest and most economical sponge to buy is the soft, fleece wool one, with a tough fibre and with a generous water-carrying capacity. These sponges may be closely used up by resorting to the following method:

When the sponge becomes worn to a small body it should be laid aside in a clean container. When a half dozen or more of these parts have been collected they may then be sewed together with soft thread until one good-sized sponge is the result. Such a sponge will work like new and will enable the painter to utilize all the ordinarily left-over parts. At the present price of sponges it pays to take advantage of any method by which the maximum wear can be had. Nearly always, too, these made-over sponges work even better than the new ones.

A sponge expert has said that dirt is ruinous to a sponge; that unless it is maintained in a clean state it very soon loses its capacity for service.

In buying sponges choose the medium-size ones; the larger ones are less convenient to handle and with them it is not so easy to do good work.

It is no trouble at all to abuse the sponge, and when this is done its wear is unsatisfactory and the work accomplished is invariably inferior. A canvas bag equipped with a shirring string makes a good, clean, tidy container for the storage of the sponge supply. A drawer with lock and key is even better.

The wash leather when worn considerably may be saved until a number are collected, and these may then be sewed together, using silk thread for the work. A couple or three of the leathers thus arranged will furnish one large useful leather, and in this manner the life of the article may be prolonged and much extra service obtained. In the case of a good leather it becomes up to a certain stage of wear better as time goes on; gets more pliable, elastic, more adhesive in relation to the surface, and carries a smaller volume of lint and shedding particles. For this reason it pays to make lasting use of the leather.

The oil-finished leather has not been so much in evidence of late years, but it is still to be seen, and it must be said that for cleaning varnished surfaces it has little to recommend it. It has small capacity for taking up moisture from the surface; can scarcely ever be made dry by wringing through the hands, and in a general way it fails to give satisfactory results in whatever way you may choose to use it.

In the use of the wash leather it is not advisable to bear heavily upon it. Take it to the surface with an easy movement; let it do the work free from any forced pressure.

Pencils for Straight Line Striping

Straight line striping is by all odds the predominating branch of pencil work at the present time. To perform this class of work the sword and dagger pencil represent the tools generally used. The round pencil for this class of work has long since gone out of fashion.

Perhaps the dagger pencil is the one most used, and with this pencil not a few workmen are able to perform miracles, or at least very near miracles. These men use the dagger pencil for drawing two or three widths of line, and thereby dispense with the trouble of carrying so many pencils in stock. But as a rule we think this practice is not good for the average workman to follow. It is better for the rank and file to have a pencil adapted to the various widths of stripe desired. Cleaner and more uniform lines are certain to be drawn with these various pencils.

The dagger pencil should be given extra fine care and kept well softened with grease and stored in a dust-proof container or holder. The former way consisted in greasing the pencil and then flattening it out against the glass or board provided. The more economical method, as the years have determined, is to lay the pencil away carefully after thoroughly greasing, with the stock simply drawn out to a natural position, and never flattened out on the glass or board. This plan gives the pencil to the workman in a perfectly natural form with the stock rested and true to shape and point.

For the cut-up lining work, and the fancy corner pieces which one now and then sees cast upon the surface at corners and perhaps in the center of big panels, a specially made pencil will be required.

To shop-make the round pointed pencil, take a large, round, camel's hair pencil and remove therefrom the desired quantity of hair. Then cut a small piece of cedar down to about ¼ inch diameter at one end and considerably smaller at the other. Insert a pin at the smaller end until it holds firmly. Then, say, one-quarter inch from the wood, clip the pin off. Now shave the stick down until it tapers perfectly down to the pin. Next take the desired quantity of hair and dip the base end into shellac, after which lay the stock aside for the shellac to harden. Now insert the pin and tapered end of the wood until the clear working length of the pencil measures at least one and a half inches from the point of the pin. The pin acts in the capacity of a stiffener for the pencil. These pencils need great care in storage and use to get the best they are capable of out of them.

Habits of Neatness

Under this caption a good friend of the writer years ago wrote an article urging the economy and advantages of neatness; among other things, as we remember, this paragraph was used: "It does seem as though some men are born slovens, but they are not; it is all acquired. One baby is as neat as another, until a slack mother implants slackness in its nature by practice or example."

Ordinarily the paint shop looks bad enough, but if the habit of being slovenly is allowed to have sway it at once becomes very much worse in the matter of appearance. If each painter employed in the shop becomes careless and throws a bit of waste, or pieces of sandpaper, or other refuse on the floor, or daubs the walls of the shop with this, that and the other color, the entire interior of the place presently takes on the look of a junk shop.

Neatness is well within the reach of all; soap and water are cheap and easy to be had. The employe who keeps himself neat and clean may as a rule be accepted as a coming fine workman. He will be found to be studious, active, ambitious and working along lines reaching up to higher things. Some men naturally skillful and good brush hands are so slovenly in their habits that despite their craftsmanship they cannot be trusted to take hold of a fine quality of work.

The neat paint shop and the equally neat working force constitutes a combination which unfailingly makes a strong impression for good upon the visitor and upon the prospective customer. Neatness in the paint shop is the strongest possible advertisement; it is a trade getter; and it costs precious little.

Usually the habit may be impressed upon at least a majority of the employes through practice and precept laid down by the proprietor of the business. Most men are fair imitators; nearly all men will follow at least decently a good example.

We have known otherwise rather slovenly painters to become quite neat in their shop habits and methods of work through the influence of a couple of exceedingly neat and clean workmen. In a way, like begets like, and even in the paint shop this habit takes over a lot of unimpressional talent.

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Ornamental Painting and Designs

It has come to a point in the history of the trade where ornamental painting is not regarded in the light that gave it favor twenty-five or more years ago. That is to say, outside of the larger cities; in these latter, the art still holds a spot in the esteem and affections of a very great number of people. It has also become a necessity from an advertising point of view. And in this respect it is a most compelling force in the community and business life of the big town.

The ornamental feature, however, has taken on in these later years more of the aspect of the pictorial. Possibly it would be correct to say that there is a blending of both the pictorial and the purely ornamental.

In any event, the so-called ornamental painter must be able to perform most expertly when it comes to casting a pictorial design on the surface in connection with what we have long been accustomed to regard as the ornamental pure and simple. Many painters of this class of work are artists in the highest essentials of the craft; they seldom use a design more than once. They have a multitude of layouts running in their mind's eye, and scorn repetition. They would not be imitators. They have the happy faculty of originating. Others may follow; they prefer to lead.

Nevertheless, it is not possible for the rank and file to practice this ornamental art in the manner here outlined. Nor do they so attempt to practice it, although in the work of developing the design on the surface, they are, for the most part, the equal of the higher type of mechanic. The man who absorbs a certain amount of imitation in his work, if it is an influence brought directly from observation of a fine specimen of ornamental or pictorial designing, is doing his community a service that must be a benefit.

It is not therefore a cause provoking discouragement when the fine pencil man finds himself influenced by more adroit and artistic designers; rather is it a reason why he should reach out for better things in his craft; develop his skill and produce the best his pencil is capable of. The fact that he can never attain the level of the highest type of artist need not be considered a handicap. It represents merely a differential.

In this light no painter need fear to copy a design which impresses him as being worthy of imitation. It is his by right of conquest, and if in developing it on the surface he is able to add a touch of originality and improve some of the details and increase the beauty of the design, he has accomplished a worthy and important work.

It may happen that a design is to be transferred to the surface intact. To accomplish this first proceed to transfer the design to the pounce, taking tracing paper, or if this is not at hand, use well oiled white paper of the common sort, and with a finely pointed lead pencil, trace the design carefully and accurately upon the paper. Then lay the pounce paper upon an old cloth-covered cushion, or something equally soft and easily penetrated, and over the paper lay the traced design, picking holes with a pin or needle.

Now make a pounce bag, using whiting for a dark surface, and Indian red or lampblack for a light one. The cloth of which the pounce bag is made should be good, strong cotton, through which the powdered pigment will sift readily.

Having secured the pounce pattern, nicely picked out, law it on the work, putting the rough side of the pattern next to the surface, and then rub the pounce bag well over the design. If the design is a large one, the pounce bag will need to be patted sharply over the dotted lines in order to insure distinct outlines. Before beginning to run the color on the surface it will be approved practice to blow off all the surplus powder.

Another method of copying designs consists of mixing up a color that will work easily, with oil as the sole liquid ingredient, and then trace the outlines of the pattern with this color. Then lay the pounce paper over the traced-out design, and firmly press the finger over all parts of the paper. In this manner we get the design perfectly transferred to the pounce paper. The lines can then be picked out as in the first method here detailed.

It should be stated, however, that in this latter method there is more or less indistinctness to contend with, arising from the blurring of the lines where they cross or interlace each other. For the beginner the first plan will likely serve the purpose best, although it takes a little longer to get the design safely marked on the pounce paper. On the score of time gained, the workman somewhat used to ornamental painting will find the latter method the readiest and quickest.

So far as possible, it will avail the workman to develop his design as an original bit of adventure in the field of art free hand, and as the design lives in the mind after careful study of it as it is worked out on the surface.

Sane Methods of Securing Durability

In our haste to get the final result we are prone to overlook the vital thing which, above all others, will secure the supreme advantage. Appearances count, it must be admitted, and the superior finish is esteemed an indispensable feature of the painter's work. But the matter of durability must be taken care of if the painting business is to survive and flourish.

One of the very first points to be considered is that of allowing for the complete drying of each individual coat of material applied. After all, if such results are not secured everything else goes for naught; for however fine and beautiful the finish may be, if it is not reasonably secure and permanent, as finishes go, it becomes an offense and causes the business to suffer correspondingly.

One of the first coats which requires most circumspect care and attention is the priming coat. This demands fine application and plenty of time in which to dry perfectly. Upon this all other materials are founded. If this coat fails all others fail likewise. And as the procession of coats proceeds on the way each and every one deserves the same safe and sane privilege; indeed, it should be the aim of the painter to secure this for these coats, for in no other way known to men may the essential result be secured.

Even the roughstuff coats, so frequently abused through the crowding process, deserve a kindlier fate. If two coats per day are required to be applied to the surface, then it is highly necessary that the material in the mixing be so adjusted that under fair drying conditions each coat may be counted upon to fully mature and dry.

In the handling of the color coats the advantage is to be had that these pigments are japan ground and therefore rapid drying, generally speaking. Especially is this true when drying conditions are reasonably good.

In the treatment of the varnish-color coats, and the clear rubbing varnish coats, what has been said for the primary surfacing coats should likewise be said for these. Always give the rubbing varnish coats the advantage of some additional time in which to dry, over what the maker has provided for, because, as a rule, conditions are not precisely what the varnish manufacturer may have in mind.

However, if the work is to be hurried at all, we should prefer to give it rapidity in the varnish stage rather than in the stage of primary coating. By extra degrees of heat and the use of quicker drying varnish time may be saved without perhaps detracting from the natural durability of the material. This cannot so well be done with primary surfacing coats.

Improved Color Results

The call for fine color results continues to be insistent; the coming automobile shows will prove this assertion beyond a doubt. The people who ride are asking for the latest in colors and for their finest display on the surface.

How are we to satisfy this plainly voiced desire? What are the requirements, and how are they to be met?

Today, as seemingly never before, colors are being furnished the painter in a state of refinement that is fairly beyond criticism. What, then, is lacking?

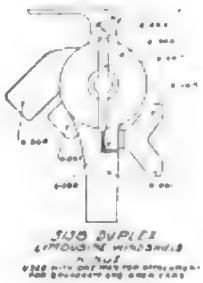
To our mind the fault, if really there is a fault worth mentioning, lies in the preparation of the color for application and in the actual work of putting it on. In the reducing of the pigment for application an over supply of mixing and beating up cannot well be expended. The superior color merits a superior amount of thinning and reductive methods. Anything short of this must be counted neglect pure and simple.

Never turn the turpentine into the vessel containing the color in a sloppy mass; color does not break up easily under such treat-

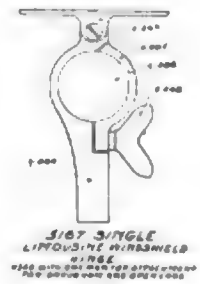
(Continued on page 56)

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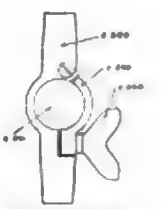
AUTOMOBILE WINDSHIELD MOUNTINGS



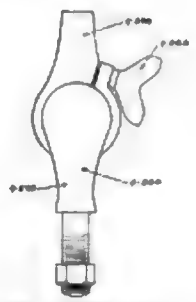
5158 DUPLEX
LIMOUSINE WINDSHIELD HINGE



5167 SINGLE
LIMOUSINE WINDSHIELD HINGE



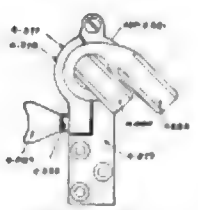
5166 CENTER HINGE



5174 LOWER HINGE

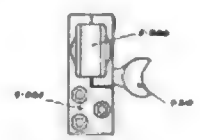
NOTE:

Hinges can be milled for ⅛", 3/16", ¼", 5/16" channel
Nos. 5167, 5166, 5174, 5164, 5187, are patented
Nos. 5158, 5163, 5185 patents applied for



5163 DUPLEX
CLOSED BODY WINDSHIELD HINGE

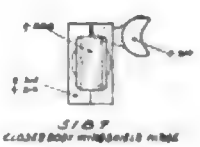
5175 DUPLEX
5163 WITH SECTION THROUGH ON 1/2"



5164
CLOSED BODY WINDSHIELD HINGE



5185 DUPLEX
CLOSED BODY WINDSHIELD HINGE



5187
CLOSED BODY WINDSHIELD HINGE

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Upholstery, Toppings, Mountings

A New Auxiliary Seat with Many Good Points

The two photographs on this page show the Miller auxiliary chair, type "C," installed in an "Owen Magnetic" coupé built for Mr. R. Owen.

Several thousand of these seats have been sold to a number of high-grade car manufacturers and they seem to be the coming thing in auxiliary seats for the good car.



An auxiliary seat that adds classiness to the car and provides comfort and safety for the passenger.



This photograph shows how completely the Miller Seat folds out of the way. It is very easy to instal and is not expensive.

THE MILLER DISAPPEARING AUTOMOBILE SEAT.

With the Miller seat it is no longer necessary to treat the extra passengers as step-children, as is the case with some of the older types of seats.

The Miller seat is designed to avoid the complicated construction in the floor of the car to receive and hold a seat that is fastened and supported at the front legs only. It also avoids the special arrangement of cross members in relation to the different chassis, which all body builders know is troublesome.

This new seat gives the extra passenger a perfectly comfortable resting place where his body can relax in safety and where he may enjoy the ride and help entertain the party without the discomfort of a twisted spine and a cramp in the leg through the constant tension due to that "unsafe" feeling.

It is claimed by the inventor that the Miller auxiliary seat can be installed in any desired position within a half hour, without injuring or impairing any vital part of the body. Most auxiliary seats as formerly made, more or less affect the design of the body, such as floor cross members, the relation of the sill to the chassis, and particularly affecting the strength of the sill, which is supposed to hold the entire body together.

With the Miller seat there is the possibility of using a deeper upholstery. A cushion as deep as 4½ to 5 inches can be easily utilized. The device is strongly built and there is no probability of its getting out of order. The seat operates by simply tilting it upward and then the opening of the lazy back automatically opens the rear legs. It will bear the heaviest person and cannot collapse under any conditions when in use. The Miller seat has a pleasing appearance and adds to the looks of the car in which it is placed. Its selling price is not higher than other seats which do not possess the advantages claimed for this invention. Further particulars can be had from Tobias Miller, 1973 West 100th Street, Cleveland, Ohio.

R. S. Allen Now With Duratex

The Duratex Company, Newark, N. J., manufacturers of Duratex coated fabrics, announce the appointment of Ralph S. Allen as general manager, with headquarters in Newark, N. J. Mr. Allen was until September associated with the Wagner Electric Company, in the Detroit territory, and is widely known in the automobile and accessory fields.

Comfort and Satisfaction

Comfort and satisfaction are the natural results when automobile cushions and upholstery are equipped with Wilson's woven curled hair.

The millions of tough, resilient little hair spirals offer just the right degree of resistance to give the proper springiness and life so much sought after in ultra-luxurious upholstery—and they are claimed to last a lifetime.

Wilson curled hair pads for automobile upholstery are made by an exclusive, patented process which firmly weaves the sterilized curled hair onto burlap, forming a shock absorbing cushion which will not shift, mat down or get bunchy. This cushion is cut to any size ordered.

Write to Wilson & Co., Chicago, Dept. VM-10, stating your requirements, and they will submit samples and prices. This company is supplying curled hair to a great many of the leading body manufacturers.

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An Unusual Sports Car

An innovation in the design of cars for pleasure use, with everything provided for convenience and comfort on touring, hunting and fishing trips is to be seen in this sedan or enclosed-drive type of body, to seat six or more passengers with provisions for sleeping four. The body embraces no new-fangled notions and is appropriately termed a twentieth century "land yacht."

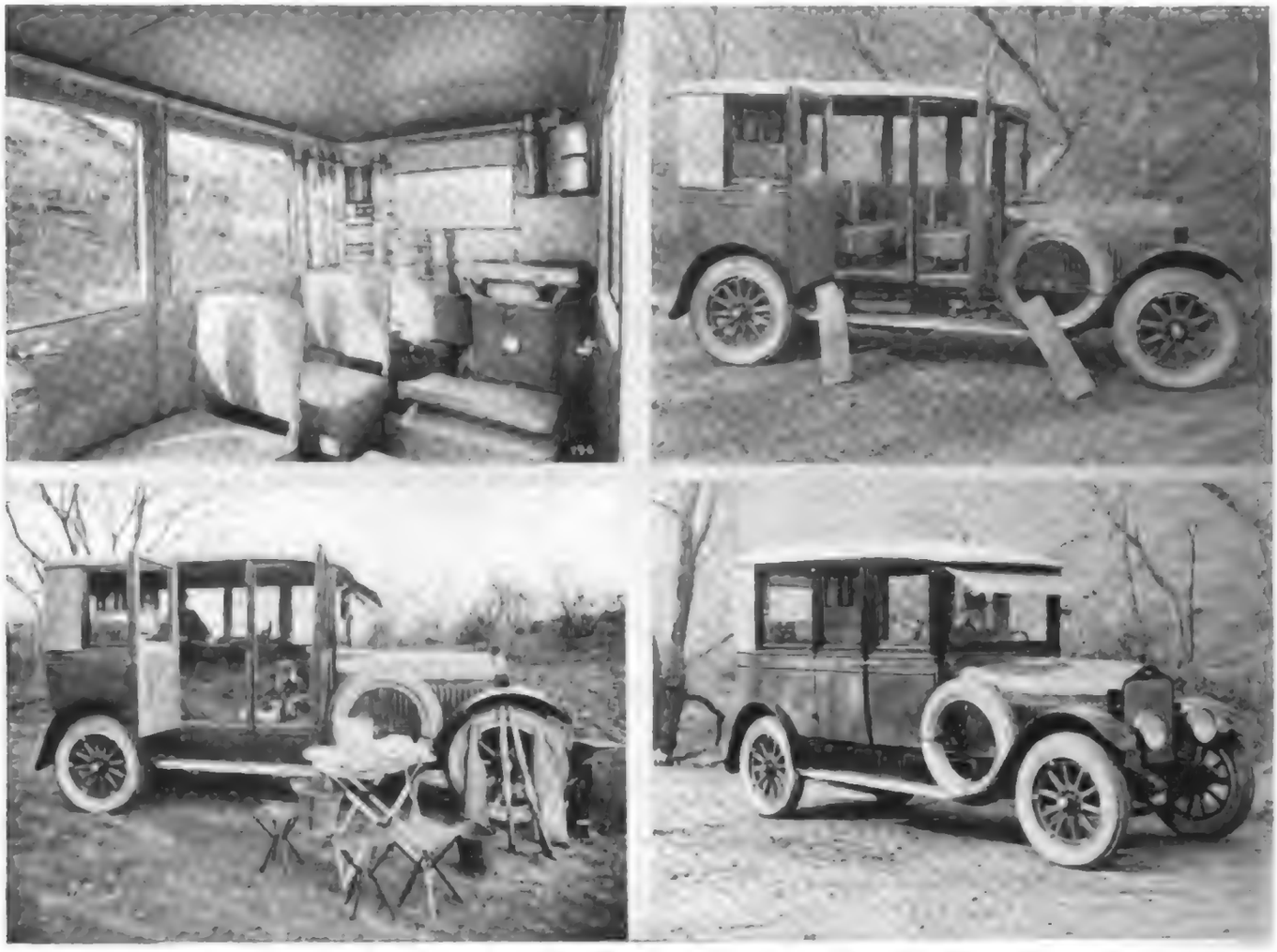
and other lights, have all been studiously designed to so camouflage the car as to create an optical illusion that makes this body appear much shorter and lower than it really is.

The finished color scheme is a harmony of tones, the body below window rail being a natural gray brown with upper of battle brown, with the roof and rear panels of clay

panels over a skeleton ash wood framing, which is well glued and securely screwed together. The wood used was perfectly cured, well seasoned and treated so as to be impervious to atmospheric changes.

Emergency fire protection is provided by means of two one-quart carbon tetrachloride pump type extinguishers, conveniently located for instant use.

The car contains six, comfortable, removable, nested, spring-upholstered seats with



AN UNUSUAL SPORTS CAR (DUNBAR AUTOMOBILE CO., PHILADELPHIA.)

Upper Left—Interior, showing the upholstered seats, the alcohol cooking and heating stove, vacuum food and drink containers, lanterns, etc.
Upper Right—Shows car interior with seats in position for passengers.
Lower Left—Hammocks in position for sleeping, also table with aluminum cooking utensils and tableware, collapsible buckets, chairs, guns and suitcase.
Lower Right—The car on the road, with nothing to distinguish it from the regular, high-class sedan.

The color scheme has been harmoniously worked out with strict consideration for character of use and recognized good taste. The rear wheels being housed with hammered steel shapes evades the heretofore general encroachment on the interior floor space and the crown type of hammered steel fenders provided with pockets on the front fenders to carry extra tires give a happy balance to the appearance of the car and avoids the appearance of excessive overhang, as would be the case if tires were hung from the rear. These conditions, together with the lines of body, in combination with colors used and the elongation of cowl and engine hood, the hanging of rear gas tank, arrangement of road

brown duck. Valentine colors and varnishes were used. The interior is of Laidlaw clay gray art leather in alligator grain for ceiling and sides, excepting around galley where satin finish aluminum is used; the floor is lined with a neutral battleship linoleum and seats upholstered with the gray art-leather. The interior colors bring about perfect harmony with the exterior finish.

Interior of the car is adequately lighted with flush ceiling dome lights, provided with conveniently located switches; there are also bull's-eye lights above cowl and head, dimmer and tail lights. The mountings are from English & Mersick Co.

The body has hand-hammered aluminum

folding backs. These seats are securely fastened to the floor, yet readily released and capable of being neatly nested when interior of car is required for sleeping or dining purposes. The seats are upholstered with alligator-grained art leather.

The car is provided with four wide doors of unique but serviceable design, fitting perfectly, and provided with door handles, locking devices on inside for security at nights and an outside lock to driver's seat for use when in a garage. On inside of each door spacious bellows type pockets are provided. All doors have polished plate glass with polished edges and are equipped with noiseless window raising devices, including side

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SINGLE-TEXTURE TOP-FABRIC



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In Top Material

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Send for a sample and convince yourself

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MOLESKIN QUALITY

WILL ENHANCE THE ELEGANCE OF
CLOSED OR OPEN CARS

Never Fades

Never Cracks

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Absolutely Waterproof

Unaffected by Oil or Grease



Its pliable and easy working qualities appeal to trimmers

Its durability causes car buyers to recommend it to their friends

Get samples, from which you can make selections to match any color scheme

O'BANNON COATED FABRICS

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and rear glass panels. Ternstedt window regulators were chosen for this car. Ample provisions are made for storm protection and essential ventilation when car is used for dining or sleeping purposes, as well as for comfort in riding.

Windshield is of the two-piece clear vision type, ingeniously provided with an awning-type of hood curtain, thereby eliminating all possibility of road glare or glass reflection and reducing rain confusion to a minimum.

All food storage, cooking and service equipment are conveniently nested in the "galley" space, located in the extreme rear of the car body and so arranged as to in no manner interfere with the sleeping paraphernalia when same is put up. In the galley section there is a small refrigerator, which, like all other devices is rigidly secured and made anti-rattling; adjoining same there is an alcohol burning marine type of range, having two burners on top, and one burner for oven underneath. The range is provided with a safety flame trap. In cold weather the inside of car is heated by operating the range.

Overhead and surrounding the galley section there are four one and four two quart capacity vacuum bottles of an unbreakable type, also four two quart vacuum food jars. Here also are found receptacles for coffee and sugar storage. One aluminum ware six-party cooking outfit is neatly nested and fitted into a canvas-covered case. This case contains coffee and other cooking pots, frying pans, bowls, cups, plates, salt and pepper shakers, knives, forks, tea and table spoons. There are also containers for paper drinking cups and napkins, also thin wood plates which are used to minimize housekeeping efforts. Close by there is stored a folding six-seat camp table and six collapsible metal camp stools, also two heavy canvas folding ten-quart water pails, besides a "safety" oil burning railroad type of lantern and two electric flash lights.

All glazed openings are provided with gray linen rolling shades which afford absolute privacy to the interior when same is lighted up at night.



INTERIOR OF 1920 LIBERTY COUPÉ.
Built by the Liberty Motor Co., Detroit.

After the folding seats have been removed, four brown canvas cots are readily and rigidly put up and when taken down the canvas is rolled around the cross bars and then the cots are stored in a long pocket formed in the back of the running board.



INTERIOR OF 1920 LIBERTY BROUGHAM.
Built by the Liberty Motor Co., Detroit.

In addition to the bellows door pockets, ingeniously arranged additional clothing caché pockets have been arranged between the skeleton of the body frame and the aluminum panels.

In back of the running boards spacious storage spaces are provided and in same there is packed an axe, spade, pick, hatchet, tow line, anti-skid chains, tools and other road and camp equipment.

The car is mounted on a White chassis with 140 inch wheelbase and straight frame. The motor is 45 horse power, with an electric starter and a special electric lighting system. The chassis is of the truck type, but has a regular White passenger car radiator. The tires are Goodrich Silvertown Cords. The inside dimensions of the body are length, 9 feet, 4 inches; width, 5 feet, 3 inches on belt line; height, 5 feet, 2 inches.

The entire body was built and equipment installed by The Dunbar Automobile Body Co., Philadelphia, from designs furnished by C. E. Schermerhorn, a Philadelphia architect. The car is the property of Dale B. Fitler, a young man who is prominent socially in the same city. Mr. Fitler will use the car on his hunting, fishing and touring trips and by so doing will be able to dispense entirely with hotels and boarding places.

A. J. Simpson & Son Co., Omaha, Neb., after sixty-one years in the vehicle business, announce that they have sold the same to A. L. Edson and W. J. Blackburn, who will continue under the name of Edson & Blackburn at 1407-11 Dodge Street, Omaha.

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Foreign Makers Adopt Duratex

Each day's news items reflect the efforts foreign buyers are making to equal American standards. An attitude of decided progressiveness is evident everywhere.



INTERIOR OF THE NEW 1920 HAYNES COUPÉ.
The striped upholstering material, which does so much for the beauty of this interior, is a mohair velvet made by The Bridgeport Coach Lace Co., Bridgeport, Conn. All of the interior above the window line is upholstered in a plain fabric of the same quality and shade of color.

A striking indication of what these foreign buyers are doing is reflected in information just received stating that the Austin Motor Co., and the Albert Car Co., of England, and the Citroen Car Co., and Alsace-Lorraine Railroad Co., both of France, have adopted Duratex upholstery as standard.

Duratex is different than any other upholstery on the market in that it is not a substitute for anything but is a product made for a particular purpose.

It is genuinely good material in which the shortcomings of other upholstery, including split leathers, have been eliminated.

Its use is becoming general throughout American automobile and furniture industries. It is significant that European makers have been so alert in sensing the possibilities of so comparatively new a product.

An Ideal Top and Curtain Material

Many of the best cars produced by wholesale and custom manufacturers are equipped with "Dridek," which, as good trimmers everywhere can testify, makes a remarkably satisfactory top. This material is handsome in appearance, has a soft, pliable finish, and will stand up under the hardest kind of service. "Dridek" is a safe material to use for tops and curtains, because it has been tested out under the most trying conditions and found to be all that its manufacturers desire it to be. The makers, besides, absolutely guarantee every yard of it, whether in leather or rubber finish. It is manufactured by the L. J. Mutty Co., Boston, Mass., makers of fabrics, designed for beauty and wear in tops, curtains and upholstery for high-grade cars. If you do not have their line of samples and latest price list, write for them. They will interest you. "Dridek" is light in weight, dependable, non-cracking and non-blistering.

A Haynes Coupé in Bridgeport Fabrics

Among the many beautiful cars that will be exhibited at the National Shows in New York and Chicago next month will be those made by the Haynes people at Kokomo, Ind. That the Haynes is a real quality car is evidenced in many details of the chassis and body construction as well as in the general design. Nowhere is the quality more greatly emphasized than in the selection of Haynes upholstery materials and the taste with which these materials are used in the car.

The two illustrations on this page of the coupé body interior, show how the upholstering looks from two different points of view. The material for cushions, backs and door trimming is a fine grade of mohair velvet, made by the Bridgeport Coach Lace Co., Bridgeport, Conn. It is in the popular taupé shade, a superb color effect which harmonizes nicely with the gray, black or dark blue painting of the exterior of the body.

While the texture of the upholstery goods is somewhat obscured in our halftone plates, it can be seen that the material has a fine stripe. Above the level of the window line a plain fabric of the same quality and shade, also made by the Bridgeport Coach Lace Co., is used. The plain material is also used for the headlining. The carpet, also a Bridgeport fabric, is in the taupé shade to harmonize with the mohair velvet upholstery and the plain linings. The fine silk curtains and various other trimming accessories also came from the Bridgeport house.

Peters Auto Body and Spring Works, Baltimore, Md., have purchased three large buildings on Ensor Street, so as to have more space to manufacture automobile springs and increase commercial body output.



ANOTHER VIEW OF THE UPHOLSTERY IN THE 1920 HAYNES COUPÉ.
The upholstery (Bridgeport Fabrics) is in a shade known as taupé, and is of a very high grade quality. This shade is very popular with the public and harmonizes nicely with a gray, black or dark blue exterior.

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Manufacturers of

THE GOODS THAT MAKE GOOD

CARPETS

THE GOODS THAT MAKE GOOD



Non-shrinkable, Durable Carpets Made Especially for Automobiles, of Wools, Worsteds, Jutes and Horse Hairs

Reproductions of several popular colors on next two pages

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Kensington and Allegheny Aves., Philadelphia, Pa.

Western Representative

JOS. H. AUSTIN COMPANY, 21 E. WOODBRIDGE STREET, DETROIT, MICH.

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Distinctive
Dependable
Motor Car
Floor
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All
Colors
Are
Fast and
Enduring





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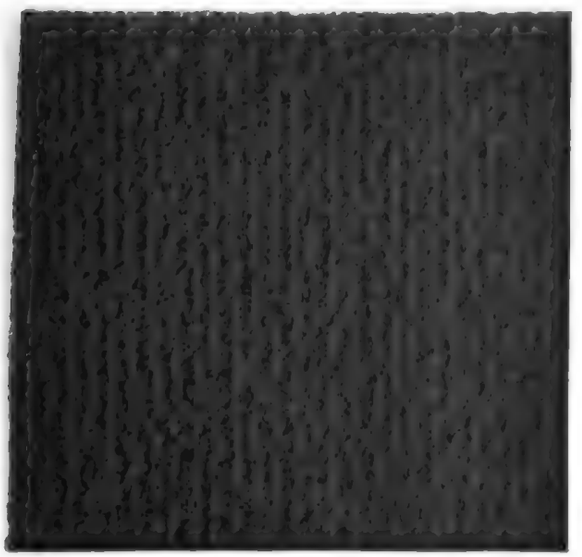
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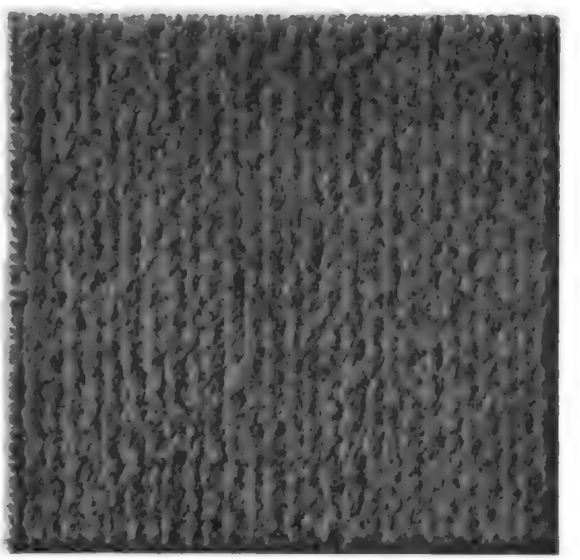
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to Match
Any Color
Trimming



You Get
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Manufacturers of

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THE GOODS THAT MAKE GOOD

THE GOODS THAT MAKE GOOD

THIS BOOK TO TRIMMERS AT COST

Experts and apprentices will find it a valuable work. It is right down to date in every phase of motor car upholstering. Contains 175 pages and is profusely illustrated. Has a rich blue cover stamped in gold; measures 6x9 inches.

$2.50 Remitted by registered letter, postal or express money order, will bring you this handsome volume, the study of which makes every trimming problem easy to solve.



REMEMBER please that we are not publishing this work for a profit—the price just covers compiling, printing, packing and shipping.

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News in the Trade

OUR CINCINNATI LETTER

General Business Conditions

NOVEMBER 21, 1919.

Business with the carriage industry is progressing in a satisfactory manner and the factories here are having a "time of it" in procuring some of the real necessary materials in order to keep up with their production. But this situation seems to be brightening and from all reports there is every reason to believe that the labor difficulties will soon pass into history and the question of getting materials of all kinds will soon be cleared up.

* * *

The Sayers & Scovill Co. is unusually busy and the same can be stated of The O. Armleder Co., The G. A. Schacht Motor Truck Co. and The United States Motor Truck Co. All of them are having an unprecedented demand for their products. Cincinnati motor car builders are rapidly growing with the automobile industry and the predictions of the "knowing ones" are that Cincinnati will soon develop to become a rather large automobile manufacturing center. Railroad facilities, lumber, coal, steel and the various commodities necessary to make automobiles are right at Cincinnati's door.

* * *

The Brown Carriage Co., Luth Carriage Co., and The Phoenix Carriage Company, three of the wholesale carriage factories here, have all the orders they can take care of and their factories are consequently humming with activity.

* * *

The automobile industry in Cincinnati is thriving and the factories are working hard to fill orders.

* * *

Will Report Road Conditions

Local weather observer W. C. Deveraux inaugurated a daily service on November 7th describing weather conditions within a radius of one hundred miles from Cincinnati. This information is in addition to the daily weather bulletin and map sent out by the weather bureau. Co-operating with Mr. Deveraux to compile this information will be postmasters and postoffice employes. Each evening they will forward to the Cincinnati office printed forms telling whether roads have been affected by storms or heavy snows.

The Cincinnati Automobile Club directors, who requested this daily intelligence, will provide a large glass road map of the State, in the club's quarters. Upon this map will be printed daily road conditions. In case of a heavy storm, hourly bulletins will be issued. Others who will receive this information will be automobile dealers and tourists. No attempt will be made to indicate whether a road is torn up or being repaired. Weather conditions that affect traveling will be indicated only.

* * *

Carriage Makers' Club

The November meeting and dinner of the Cincinnati Carriage Makers' Club was eliminated, but already Perrin P. Hunter, chairman of the entertainment committee of the club, is arranging for a rather elaborate time for the Christmas celebration, which will take place no doubt at one of the leading hotels about one week prior to Christmas. These Christmas celebrations, together with the June outing, are the two most important events of the club's yearly program, and are always anticipated by the members with a great deal of pleasure.

* * *

Hardwood Manufacturers' Conference

More than one hundred lumbermen attended a conference at the Hotel Sinton on October 21st and 22d. This conference was arranged by the American Hardwood Manufacturers' Association, for the purpose of meeting a representative of the forestry section of the Treasury Department, who came to Cincinnati for the purpose of explaining the questionnaires sent out by that department in connection with the making of returns for the excess profits tax assessment. This was the first of several meetings arranged by the association, the others to be held later at points in the South.

* * *

Foreign Trade Delegates at Cincinnati

Leading business men of England, France, Belgium and Italy comprised a trade delegation which, traveling through the United States under the auspices of the Chamber of Commerce of the United States, were guests of Cincinnati on the 5th instant. The delegates are visiting the important trade centers of the United States.

* * *

The Delker Dinner

The following Cincinnati gentlemen were guests of Frank H. Delker, the newly elected president of The Carriage Builders' National Association at a dinner, given at the Planters' Hotel, St. Louis, on November 5th: Theodore Luth, George W. Huston, Clen Perrine, W. F. O'Brien, Otto Heinrichsdorf and C. J. Rennekamp.

Tri-State Farm Products Show

Numerous exhibits of farm products, implements and machinery will be the feature of the Tri-State Farm Products Show in Cincinnati Music Hall on November 29th to December 6th.

* * *

T. J. Corcoran Co. Doubles Capacity

The Thomas J. Corcoran Lamp Co. are doubling their capacity and have let a contract for the erecting of a four-story fireproof addition to their present plant.

* * *

The Queen City Forging Co. are rapidly recuperating from their recent fire the early part of the month. Part of one of their buildings was destroyed, but the machinery was left intact.

* * *

Wm. H. Souders, of The Textileather Company, with headquarters in Chicago, was a recent visitor in Cincinnati. He reports trade with his company as being exceptionally good.

* * *

R. C. Schemmel, of the Backstay Machine and Leather Co., called on his trade in Cincinnati during the month. Mr. Schemmel states that business is rushing with his house.

* * *

All the Cincinnati accessory houses are deluged with business, and the same conditions prevail with the various supply houses.

LaFayette Car Has Modern Plant

With a large, modern plant as a basis of operations, one of the gravest problems usually confronting new manufacturers has been automatically removed from the LaFayette Motors Company, of Indianapolis. The present plant, while it is amply large to take care of immediate production requirements, is only the first unit of a model industrial layout. It was used by the Government during the war for the production of hand grenades and other ordnance, and 2,500 men were employed in it. It is located on a tract of 25 acres owned by the LaFayette Motors Co. The factory is now being equipped with machinery especially adapted to the specifications of the LaFayette car. The company plans to exhibit a car during the New York show in January, and expects to be in production early next summer.

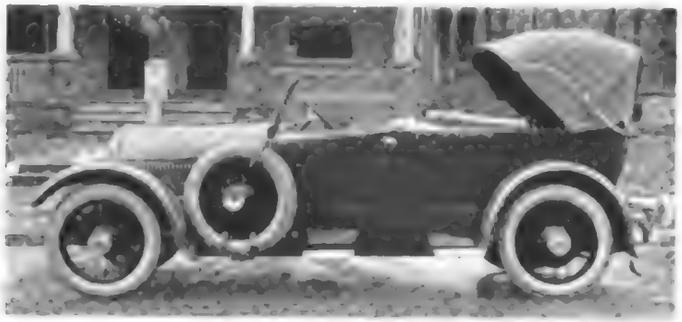
The Rubber Products Company, Barberton, Ohio, announce that their business during the past few months has more than doubled. The distribution of "Stronghold" tires is developing rapidly in all parts of the country and abroad.

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The New York Salon Show Review

America's finest display of automobiles, the Salon Show, opened in the grand ball room of the new Commodore Hotel, New York, on Monday, November 17th and continued until Saturday evening, November 22d. In comparison with former exhibitions it evidenced a fair degree of advancement.

The number of exhibitors was about the same as at former shows, but this show is not of that class that tries to create an impression through numbers, but relies upon its exclusive character. It is essentially a show of merit.



Daniels "Eight" Seven-Passenger Victoria, Model D. Daniels Motor Car Co., Reading, Pa

The Salon Show is about evenly considered in the minds of the public as the importers' show and a body exhibit. Foreign cars are usually equipped with American bodies. These are of course special designed jobs and therefore body builders who specialize in this class of trade take advantage of the opportunity and exhibit independently, and as a body unmounted never has the same effect as when shown assembled, American cars with special bodies have become as much a part of the show as the foreign. Then, too, the number of exhibitors being about a score and the total of the exhibits being less than a hundred, the advertising value of being placed among so few is taken advantage of by makers bringing out new cars. There is much better chance of being noticed and talked about, because every car is sure to be investigated by all who come to the show. The crowd is seldom so great as to impede progress in going about freely, and those in attendance have time to give attention to all inquirers.

The Rolls Royce, Renault and the Delage exhibited foreign-built bodies. The first named showed their conventional cabriolet, with round corners and well rounded top bow. There were more cabriolets shown than usual. The majority were similar to the lines of the one mentioned. There were two with square rear corners, however, and one had the inside folding seats facing forward. The Fleetwood body on Packard had the bevel edge to fore body and the belt line was continuous from the hood, the blue color scheme and disk wheels made this body one of the best at the show.

The Renault exhibit included two town cars, one brougham and one town limousine. The bodies at this exhibit were the only ones using interior natural finish woodwork. On their large body this was very ornate and the roof design was a center panel of cloth with wood to complete the rest of the space. At this exhibit also was one of the two limousines at the show, the Locomobile exhibiting the other.

There were more sedans than any other closed body. They were all of the slant windshield class. That shown by Brewster and Rubay had new types of shields. Brewster used the same form of shield last year, except that this time, the upper glass is made to swing in place of sliding as formerly. This shield seems to be very practical, and it is proposed to manufacture it commercially.

The Rubay shield is new in design and principle. The shield is three pieces of glass; two are set on the slant and the third is set at the perpendicular pillars. This latter comes only half way up from the bottom and the upper space is entirely open. The triangle spaces at each side, which are usually closed by glass, are in this design open, and the principle is that the forward movement of the car will by suction draw the air from the interior of the car through the opening, by decreasing the air pressure and permitting the air inside to float outward.

It is claimed that the smoke of a cigar at the position of the front seat will go out in place of being driven toward the rear as usual. No doubt the action that we usually term the back draft, will be responsible for some of the ventilating features when the entrance of air through the front shield is sufficient.

The average shield as used on closed bodies has some drawbacks that are seriously in need of correction, and it is encouraging to see these two innovations that are intended to make for betterment.

The Daniels sedan had a leather visor set rigidly in place. Brewster also used a similar arrangement in conjunction with their shield, but the first named has been applied in connection with the regular shield, and it bids fair to become a standard feature the coming year, because a large number of users are placing imitation leather over the ordinary glass, and as the purpose is to keep out the sun rays, the shield might as well be made stationary and use a fabric similar to the top material and so be more economical.

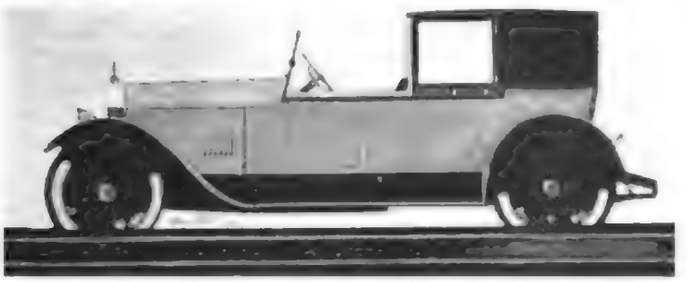
One very noticable feature on the sedans was the number that made provision for use as an all the year car by eliminating the trimming above the waist. All the Brewster enclosed bodies are "skeleton" from a line above the seat back and sides; the framing of the body and the roof bows show, and are painted a dull grey color. The Daniels also had one body similarly finished and the Rubay body had cane work in all the interior panel spaces while the wood frame was finished natural.

The sedan is replacing all other large closed body models. Also it is becoming

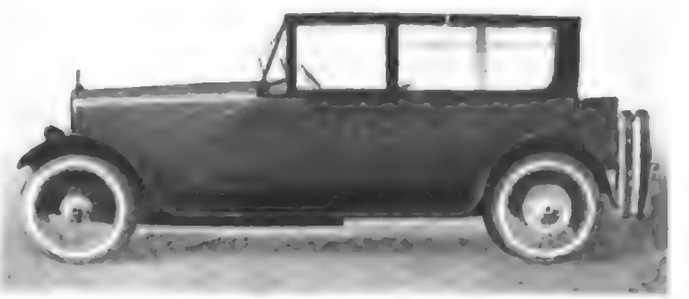


THE NEW CHICAGO MOTOR BUS WITH ENCLOSED UPPER DECK.
For a description of this interesting city passenger vehicle see page 28.

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A RUBAY TOWN CAR.
Built by The Rubay Company, Cleveland, Ohio.



A RUBAY SEDAN.
Built by The Rubay Company, Cleveland, Ohio.

popular as the all seasons model. The above evidence just cited provides for the summer months when the windows must be open and the trimming on some of these bodies was made plain. All this is to provide for the body interior to be more easily cleaned and kept so.

The coupé, which is a small edition of the sedan, was exhibited by the Daniels only. This was a four passenger job, with the seat at front on right side, folding under the cowl for entrance to the rear seat. The coupé does not interest New York buyers as much as it does those in the smaller cities, where it takes the place of the town car and is the ideal combined body for business and pleasure.

There were several new cars shown with open bodies. The Delage had a foreign-built body with wood trim on the top of the body side. This car also had running boards that were finished with scuff plates about one-half inch wide, screwed on parallel to the length of the board, and between these plates were depressions the depth of the board and about the width of the plates, having drain holes at the bottom. These depressions were in series and about 18 inches long. The extra tire was at the right side, the forward door at that place being eliminated and the running board ending in a depression for the tire. The windshield was one piece and without metal frame along the top, and the corners of the glass were rounded. One other feature was the use of pillow cushions in place of foot rests. The same idea of using pillow foot rests, but of the square shape, was also used on several other open bodies.

There were three concave side touring bodies exhibited, the Meteor being one. It was a Fleetwood body. This job had "V"-shaped radiator and windshield. The front elevation of the radiator was oval shaped. The concave of the side was moderate and similar to the tulip-shape seats made in the early automobile days. At the rear it was a moderately convex shaped and the corners of the body were round.

The Porter was another body with concave side. This job had bevel top edge and second cowl. This was one of the few large touring bodies at the show, the majority being the five-passenger size. The Revere was of this latter class and they had two touring bodies and one runabout. One body was marked as sold to King Alphonso of Spain. This was a white body with pigskin trimming and victoria top. These Revere bodies had thinner top edges of the body side than usual, on their small bodies; painted in light colors this looked very well. The Dupont was the third concave-sided body.



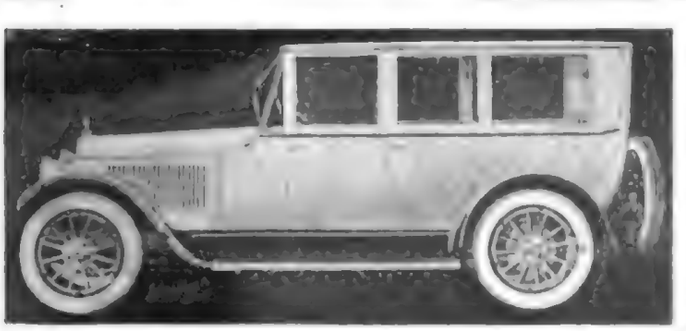
SEVEN-PASSENGER ENCLOSED DRIVE BODY.
Painted in rich navy blue and lined in imported tan silk repp.
Built by The Holbrook Co., New York.

The Daniels touring body had a skeleton victoria top of khaki canvas that looked as if made for service, while also presenting a very fine appearance.

The Brewster "Country Club" runabout is designed for comfortable riding for four passengers. The extra seat at the rear is of the folding type and there is plenty of foot room and also space to carry most anything that will be required. This seat folds over and the space is covered by the seat back. There is a cover to fasten over the remaining space up to the back of the front seat. The top is a flat curtain over rods and these are hinged, so that when not in use it is folded down back of the front seat. An apron covers this and the only part to show are the ends of the side rods. The instrument board is divided similar to the manner of providing locker space in former times before this board came into use.

Most of the bodies, both open and closed, used the flush doors. There were several with the "T" molding, but the overlap panel was almost extinct, not over two or three being so made. The use of the outside door handle was about "fifty-fifty" on open bodies and the most used type of handle on all bodies was the straight bar type; many of these had rubberized finish, but a few were of nickel and silver. Outside hinges were used in about the same proportion as the handles.

The effort to make a clean finish to the rear of the chassis was quite noticeable. The Fleetwood used a cage over the tank and the top served as a luggage carrier. The Rubay dressed the rear end with a carrying board,



A SUPERB SEDAN BODY.
Built by The Rubay Company, Cleveland, Ohio.



DANIELS "EIGHT" SUBURBAN LIMOUSINE, MODEL D.
Built by Daniels Motor Car Co., Reading, Pa.

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Standard Wheel Company Passes to Carl D. Fischer

One of the greatest manufacturing industries of Terre Haute, Ind., changed ownership last month. The Standard Wheel Company passed from the control of Crawford Fairbanks to that of Carl D. Fischer, who for many years has been president and manager of the great institution. Final papers in the transaction have been signed, and by them Mr. Fischer becomes sole owner.

No figures as to the purchase price have been given out, though people who profess to have some idea as to the value of the plant consider that considerably more than a half million was involved in the sale of the largest institution making wheels of all kinds in the world. It is stated that the physical properties—buildings and equipment—was given an appraised valuation of $853,000. Along with Carl Fischer, his son, Emil Fischer, is to have an interest in the company and will participate in its management.

The new corporation which is taking over the Standard Wheel Works Company is capitalizing it at $800,000, of which amount $400,000 is in 7 per cent. preferred stock and $400,000 in common stock, Carl D. Fischer controlling the common stock.

With the transfer of ownership in the wheel concern, many improvements are at once to be gotten under way. The first of these will be in connection with the malleable plant, the capacity of which is to be doubled. This work of enlargement will be undertaken as soon as possible, as the malleable department has been running behind in production for a long time, and there is no way to increase it excepting through the building of an addition.

The great success of the Standard Wheel Company in recent years has been due in great measure to the highly developed business methods of Carl Fischer. It was Mr. Fischer who built the malleable department, and now that he is in complete control of the Standard, one of his first moves will be the doubling of its capacity.

Prior to the sale just consummated, Mr. Fischer owned but one-third of the stock of the Standard Wheel Company. That he is hereafter to have full management of the great plant will be most pleasing news to his business friends, both at home and throughout the scope of the Standard's business activities—which embraces the whole of the United States and Canada.

Lenhart Motor Truck Co.

The Lenhart Motor Truck Company, Minneapolis, Minn., has been incorporated with an authorized capitalization of $250,000. The officers are F. F. Lenhart, president; E. L. Leicher, vice-president; F. A. Leicher, secretary; R. F. Lenhart, treasurer and manager. The directors are F. F. Lenhart, E. L. Leicher, F. A. Leicher, R. F. Lenhart and O. L. Langworthy. F. F. Lenhart and R. F. Lenhart have previously owned and operated the Lenhart Wagon Works of Minneapolis. O. L. Langworthy, also of Minneapolis, is owner of the Langworthy Lumber Company, operating a line of retail lumber yards throughout the Northwest. F. A. Leicher and E. L. Leicher reside at Luverne, Minn., and own and operate the Luverne Automobile Company, which has been very successful in the motor car and truck manufacturing business.

An Irish Coachbuilder Visits This Country

Among visitors at THE VEHICLE MONTHLY offices last month was Daniel Alesbury, of Alesbury Brothers, manufacturers of coach bodies and bent wood work, Edenderry, Kings County, Ireland. Mr. Aleshury is an Englishman of culture and refinement who established his business in Ireland forty years ago. His company for a long period did saw mill work and wood bending, later developing into a coach and motor body enterprise. Mr. Aleshury informed us that many carriages and coaches are still being built in Ireland, and nearly every farmer owns a carriage. Because the Irish are so fond of horses and horse-racing he believes it will be a long time before Ireland abandons the carriage.

Mr. Alesbury has been visiting a number of American and Canadian cities, making business connections with manufacturers and jobbers of coach and motor car parts and materials. He was also interested in obtaining a source of supply for black walnut timber, of which his firm uses considerable.

The Prince of Wales, who has just left our shores, said that New York City was a sight the like of which he had never before imagined, and Mr. Alesbury remarked that he entirely agreed with the prince. He had been told, he said, that the buildings in New York were so high that the upper stories had to be built on hinges so they could be bent over to let the moon pass by. "And, believe me," said Mr. Aleshury, "when I looked up at the Woolworth building, I began to think there might be some truth in that statement."

Chicago Vehicle Manufacturers Elect Officers

At the annual meeting of the Vehicle Manufacturers' Association of Chicago, Ill., held in October, the following officers were elected: President, C. P. Kimball, representing C. P. Kimball & Co.; vice-president, F. A. Watson, Auto Remodeling Co.; treasurer, M. D. Maremont, Maremont, Mfg. Co. The above named officers, with the following constitute the Board of Directors for the ensuing year: C. D. Heile, H. McFarlane Co.; G. S. Fridley, Wm. J. Hughey & Sons; W. A. Press, Jacob Press & Sons; Clyde Metzler, J. Metzler & Sons; Fred. L. Meckel, Fred. L. Meckel Co.; H. W. Corris, Detroit Electric Car Co.; C. A. Wever (retiring president), Commercial Auto Body Co. The association is composed of vehicle body manufacturers of Chicago and vicinity. The regular meeting night is the second Tuesday in the month. The secretary is A. McCausland, 189 West Madison Street, Chicago.

J. S. Burdick With New Company

The Buffalo Body Corporation, which represents the culmination of plans upon which R. J. MacKenzie and K. B. MacDonald, owners of the Buffalo Pressed Steel Co., Inc., have been working for several months, was incorporated in September. Adequate plant space for the new company's immediate requirements, room to grow, and a body engineer of known capabilities are among the assets with which it starts.

In active charge of engineering activities, the company has placed John S. Burdick, who is made a vice-president. Mr. Burdick was body engineer for the Locomobile Company of America, Bridgeport, Conn., prior to assuming his new duties at Buffalo.

It is revealed that Mr. Burdick had planned to establish a body manufacturing company of his own, a plan which he gave up in joining his new connection. He has been with the company some weeks now, supervising equipment and in other ways preparing the new venture for its first steps. He will keep in close touch with developments in European body building practice, so that clients of the Buffalo organization may have all the best thought at their disposal.

The immediate purpose of the company is to build enclosed bodies. It has secured the property formerly belonging to the Buffalo School Furniture Co., situated in the heart of the city's best labor market, and containing about 150,000 square feet ready for immediate use. In addition some eight acres have been acquired for future expansion purposes, together with an additional building containing 90,000 square feet of floor space. This building is the very latest type, and of fire-proof construction.

The plans of the company are of decidedly large proportions. It is expected that several separate manufacturing units will be established eventually, each given up to the manufacture of a separate class or grade of body construction. In the optimistic views of the company's founders, "Buffalo is to be made one of the real centers of the body building industry."

Orders on hand amount to 2,000 enclosed bodies of the highest grade. The factory is already in production.

Personnel of Willys Corporation

The executive personnel which will direct the financial and industrial activities of the Willys Corporation for the ensuing year was announced today by John N. Willys, president. In addition to President Willys, the officers are J. R. Harbeck, vice-president, in charge of New York executive office; C. O. Miniger, vice-president, in charge of Electric Auto-Lite Division operations; J. Allan Smith, vice-president, in charge of New Process Gear unit operations; Jay V. Hall, vice-president in charge of motor car production; E. P. Decker, treasurer; and C. B. Mertz, secretary. The board of directors is composed of John N. Willys, Edward F. Swift, F. S. Wheeler, J. R. Harbeck, Charles Stolberg, C. O. Miniger, J. Allan Smith, Jay V. Hall, C. B. Mertz and J. E. Kepperly.

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If it "*looks*" like leather
If it "*feels*" like leather
If it "*wears*" like leather

It is COTEX

The Dependable

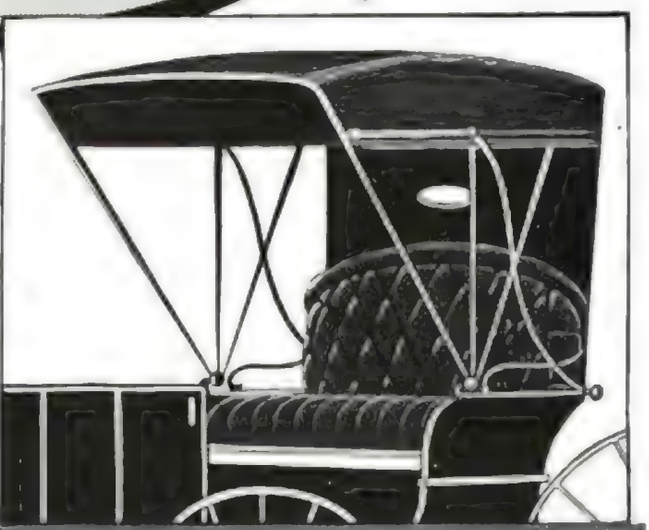
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Improved Color Results

(Continued from page 39)

ment. Add, rather, the thinning medium gradually, little by little, until the pigment becomes soft and liquefies smoothly. Then set aside for a little time for the color to settle and compact together in its atoms and body. An hour of quietness for the color to "find itself" will improve its working properties greatly.

However, all japan ground colors are at their best when thinned and prepared just prior to their use, as above described.

The finest colors are as a rule those with a so-called inferior covering capacity; colors, in fact, partially transparent. Such colors should not be forced, through a failure to thin them down to a point of securing smooth, clean application, to cover as good as the less expensive and more unrefined color. In all such attempts the outcome is practically certain to be a brushy, coarse, rough color application.

New York Salon Show

(Continued from page 52)

and the Sunbeam and Revere gave good examples of the shaping of the gasoline tank to conform to and fill the space between the side members of the frame.

On the foreign cars the absence of the dust apron tends to give this part of the frame a naked look as compared to the native chassis. Also on the first named the practice continues of carrying the extra tire at the side and forward. Some American cars that sell to a similar class of trade as the imported, adopt the same custom.

Fender and Wheel Features

One thing was very noticeable regarding the fenders in that the type known as the crown was generally used; there was one leather fender job, and a very few had fenders using a skirt separately put on. There were a few with six fenders, quite a number used the fender without running board, replacing the latter with steps.

Both the wire and disk wheel were used. The latter looks extremely well when the disk is painted a suitable color. It looked best on those cars where a lighter shade of color was used than the ground color of the body. In this same connection those closed bodies that used two distinct colors made the best appearance, the lighter below and the dark above. The blue, known as the Rolls-Royce blue, was used to good effect on both the open and closed bodies.

Trimming Materials

The trimming used on closed bodies was mostly wool fabric of colors nearly approaching the French grey. There was only one velour trimmed body and the touring bodies used leather, mostly black, the one exception being the Brewster runabout that used a waterproof cloth.

Mountings and Accessories

The metal appointments were mostly dull silver finish. The Fleetwood cars used a gold finish. The dome lights were limited to one in the centre and corner reading lamps. Rope robe rails were used and the ends finished to match the metal finish of the other parts.

Trim Designs Were Mostly Plain

The trimming design was in all cases extremely plain; only one showed the carpet line on the door. The doors were severely plain trimmed. The trimming design of cushion and seat back was uniformly what is known as the straight pleat. This was used both on open and closed jobs. A few were finished flat, notably the Rubay sedan and the Porter touring bodies.

Head and Cowl Lamps

Cowl lamps were used more generally than would be supposed and pillar lamps were used on one Kellner body on the Renault chassis. The head lights were generally large, but it was noted that where the body of this lamp was painted of some color other than black, that it looked better than when all nickel.

The Porter engine hood that was without the piano hinge was much better looking. This hood showed the line unbroken and was far better than where the hinge was visible and dotted with rivets.

Paint and Finish

The paint scheme was not varied. Gray, bronze green and blue and black were the best combinations on closed jobs, and there was a general tendency to use striping. All cars, except where the stripe was too wide and did not blend in color with the ground color of the body, furnished a decided improvement over those cars that were finished in the plain color.

Brown Body Corporation

The Brown Body Corporation, Cleveland, Ohio, formerly the Brown Auto Carriage Co., will specialize in commercial truck bodies in addition to their regular line of special custom built passenger bodies. This company is erecting a large plant in Cleveland, containing in the first portions completed over 100,000 square feet of floor space. The entire factory will be in production in the early part of 1920.

Philadelphia Vehicle Builders

The regular monthly meeting of the Carriage, Wagon and Motor Body Builders' Association of Philadelphia, was held at the Hotel Hanover, in that city, on Friday evening, November 21st. On this occasion several applications for membership were favorably acted upon.

Blocksom & Co., Building Plant

B. H. Blocksom, having severed his connection with Wilson & Co., Chicago, has formed a company of his own and is preparing to do business on his own account at Michigan City, Ind. The Blocksom & Co. plant is still in course of construction, but will be ready for operation in the very near future.

Mercer to Enlarge

The controlling interests of the Mercer Automobile Company, Trenton, N. J., have confirmed the report that the concern has been sold to a group of automobile manufacturers. Emlen S. Hare, formerly vice-president of the Packard Motor Company, New York City, is president of the new company. Approximately $1,000,000 of new capital will be put into the organization, $650,000 of which will be spent in improvements and enlargements of the present plant. The company hopes to have production increased to 3,000 cars a year by January 1, 1920.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

AUTOMOBILE TRIMMER WANTED.—We have an exceptional opportunity to offer a first-class all around man. Steady position and a fine opportunity for advancement. Good wages. Address "649," care THE VEHICLE MONTHLY, Philadelphia, Pa.

FOR SALE.—White oak wagon poles, 3 x 6 in. butt, 3 x 3 in. point, 12 ft lengths. F. F. BOWN MFG. HOUSE, Box 509, Pittsburgh, Pa.

WANTED.—A live salesman to sell truck bodies in Western territory which have many patented features. Liberal commission. Address all communications to THE BERGSTROM-BREWSTER COMPANY, Denver, Colo.

WANTED.—Opportunity. Not afraid of hard work if there is a chance to make good. Have reached limit at present employment. Ten years' practical experience in all departments of vehicle manufacture. Three years superintendent, present capacity. Age 32. Single. Exchange references. Address "695," care THE VEHICLE MONTHLY, Philadelphia.

POSITION WANTED.—A first class draftsman and designer, familiar with best methods of production, desires position as superintendent or draftsman in a large automobile plant. Address 744 Laurel Street, Flat 15, Cincinnati, Ohio.

FIRST-CLASS TRIMMERS WANTED—Nationally known automobile company has opening for men who are accustomed to high-grade work, steady work; well heated and lighted shop, with cafeteria arrangement. State salary and general experience. Address "AUTOMOBILE," Room 2502, 110 West 40th St., New York City.

FIRST-CLASS BODY FINISHERS WANTED.—Nationally known automobile company has opening for high-grade finishers. We want two men who are accustomed to working on high-grade automobile bodies. Steady work; well-heated and lighted shop with cafeteria arrangement. State salary and general experience. Address "EFFICIENT," Room 2502, 110 West 40th St., New York City.

WANTED.—FOREMAN FOR WOODWORKING DEPARTMENT OF AUTO-BODY FACTORY IN THE EAST. Must be absolutely first-class man, exceptionally reliable. Must understand thoroughly and have had experience in quantity production including mill work, templets, jigs, shaping boxes, etc. Must be capable of handling highest grade of body work in the country in quantities of 50 and 75. Must possess highest executive ability in handling labor to produce best results. Answer, stating experience and salary expected. Address "696," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—By an up-to-date man, a position as superintendent or manager of an auto body plant. Now employed as factory manager. Can guarantee efficiency. Address "700," care THE VEHICLE MONTHLY, Philadelphia.

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The MILLER DISAPPEARING CHAIR

An auxiliary seat that adds classiness to the car and provides greater comfort and safety for the passenger.

Illustrations show it in both collapsed and upright positions.

Notice how completely it folds out of the way.





Producing it in large quantities, we are enabled to furnish the Miller Chair at a figure that

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CLEVELAND, OHIO

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What determines your selection of a Truck Tire?

Mileage? Kelly Caterpillar tires carry the greatest mileage guarantee ever put on a truck tire—15,000 miles.

Traction? No other truck tire can possibly deliver the engine's full power to the road as the Caterpillar does, because no other tire has the road-gripping qualities which its patent-protected construction gives.

Resiliency? Its greater depth of rubber would alone make the Caterpillar more resilient than the ordinary type of truck tire. In addition to its unusually high profile, however, the Caterpillar has a system of side vents which enormously increases its resiliency by enabling the rubber to flow under load.

These are a few of the reasons that are leading the biggest fleet-operators in the country to replace their old tires with Kelly Caterpillars.

KELLY-SPRINGFIELD TIRE COMPANY
General Sales Department
4614 Prospect Ave., Cleveland, O.

KELLY SPRINGFIELD TRUCK TIRES
CATERPILLAR TREAD



Get This Truck's Record Is All We Ask

We honestly believe that no business house, in its own interest, can afford to buy any truck without fully informing itself about the Gramm-Bernstein.

It should know, for example, that their exists a distinct preference for this truck among experienced buyers.

It should know, also, that this preference—which by the way, is enjoying a very healthy growth—is a perfectly logical development. It should know that Gramm-Bernstein owners are genuinely satisfied.

Our owners will testify that a Gramm-Bernstein lasts literally for years.

That operating upkeep and repair costs are extraordinarily low—and especially so in ratio to the service the truck renders.

And that when they need another truck, or more trucks, their choice is invariably the Gramm-Bernstein.

Gramm-Bernstein engineering finds its latest expression in our new 5-ton truck, which has already had a test equalling two years' ordinary travel of a 5-ton vehicle.

We ask no business to buy our trucks on our say-so—though that is a perfectly safe thing to do.

Gramm-Bernstein performance and service are matters of record. Any one of our dealers will place the facts before you, and put you in touch with our owners.

The most we ask is that you get the complete information.

Gramm-Bernstein Worm-Drive Trucks, in in 1½, 2, 2½, 3½ and 5-ton capacities, are now sold completely equipped, ready for the body—not an extra to buy.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Patent Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194994.

The Gramm-Bernstein Motor Truck Co.
Pioneers Since 1901 — Builders of the First Liberty (U.S.A.) Truck
Lima, Ohio, U. S. A.

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Goodyear's Intention



IT is the present intention of Goodyear, as it always has been, to make only a grade of carriage tire rubber that will add to the value of your vehicles.

Thus when your buggies, your carriages, your delivery wagons, are on the sales floor equipped with Goodyear Tires, there is going to be an added incentive for buyers to own them.

This favorable attitude on the part of users towards vehicles on Goodyears is the very natural result of two conditions.

The first is the world-wide acceptance of the fact, which is due to actual experience, that all Goodyear products do wear a long time.

The second influence is the broad plan of advertising adopted by Goodyear, in which the merits of Goodyear products are told in terms of **results secured by users.**

We suggest that you ask one of our representatives to call and explain in detail how you can profit through the use of Goodyear Carriage Rubber.

The Goodyear Tire & Rubber Company
Offices Throughout the World

GOODYEAR

ILLINOIS IRON & BOLT CO.

Manufacturers of

HIGH GRADE

Steel Axles and Wagon Castings

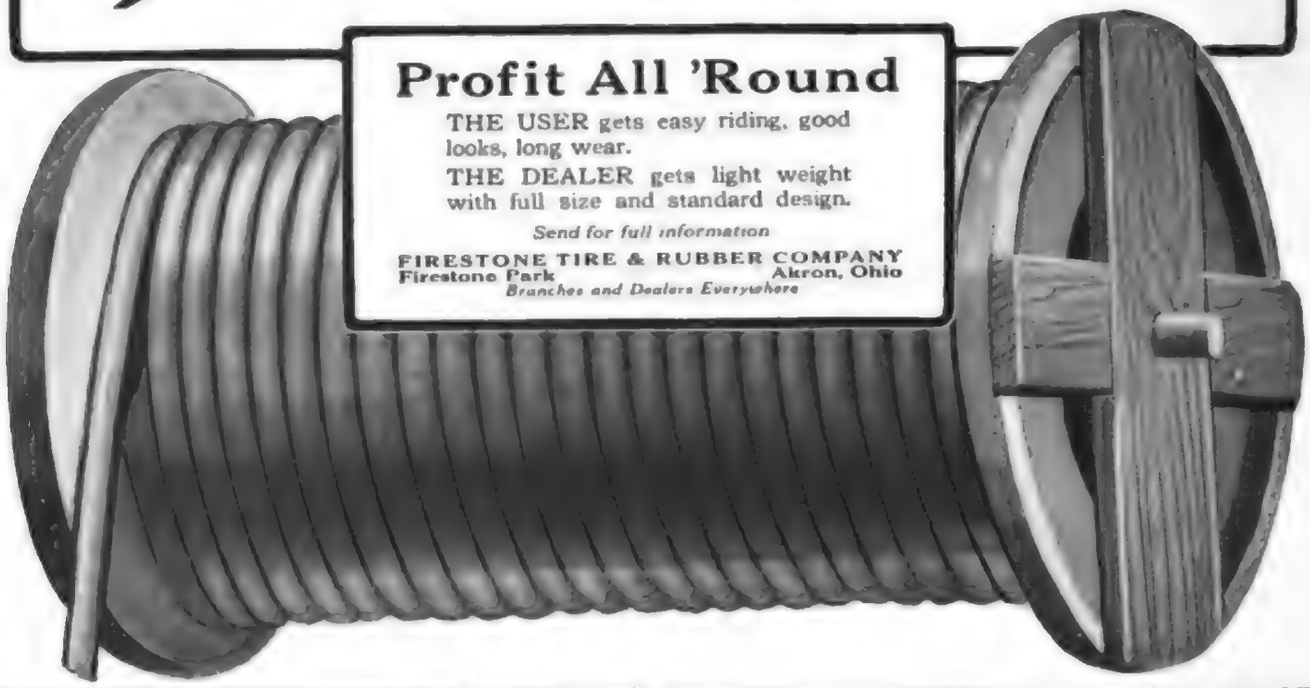
Ball Bearing Trailer Axles with Interchangeable Sarven and Artillery Hubs

Write for Particulars

ILLINOIS IRON & BOLT CO.
CARPENTERSVILLE, ILL.

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Firestone Carriage Tires



Profit All 'Round

THE USER gets easy riding, good looks, long wear.

THE DEALER gets light weight with full size and standard design.

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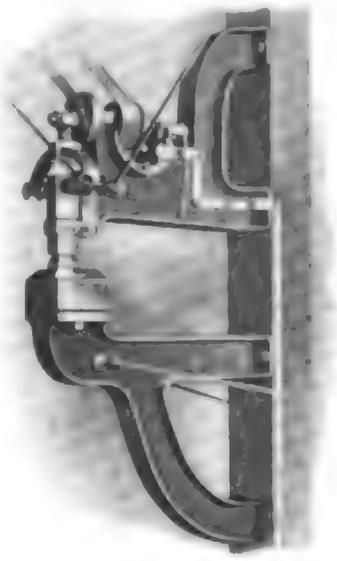
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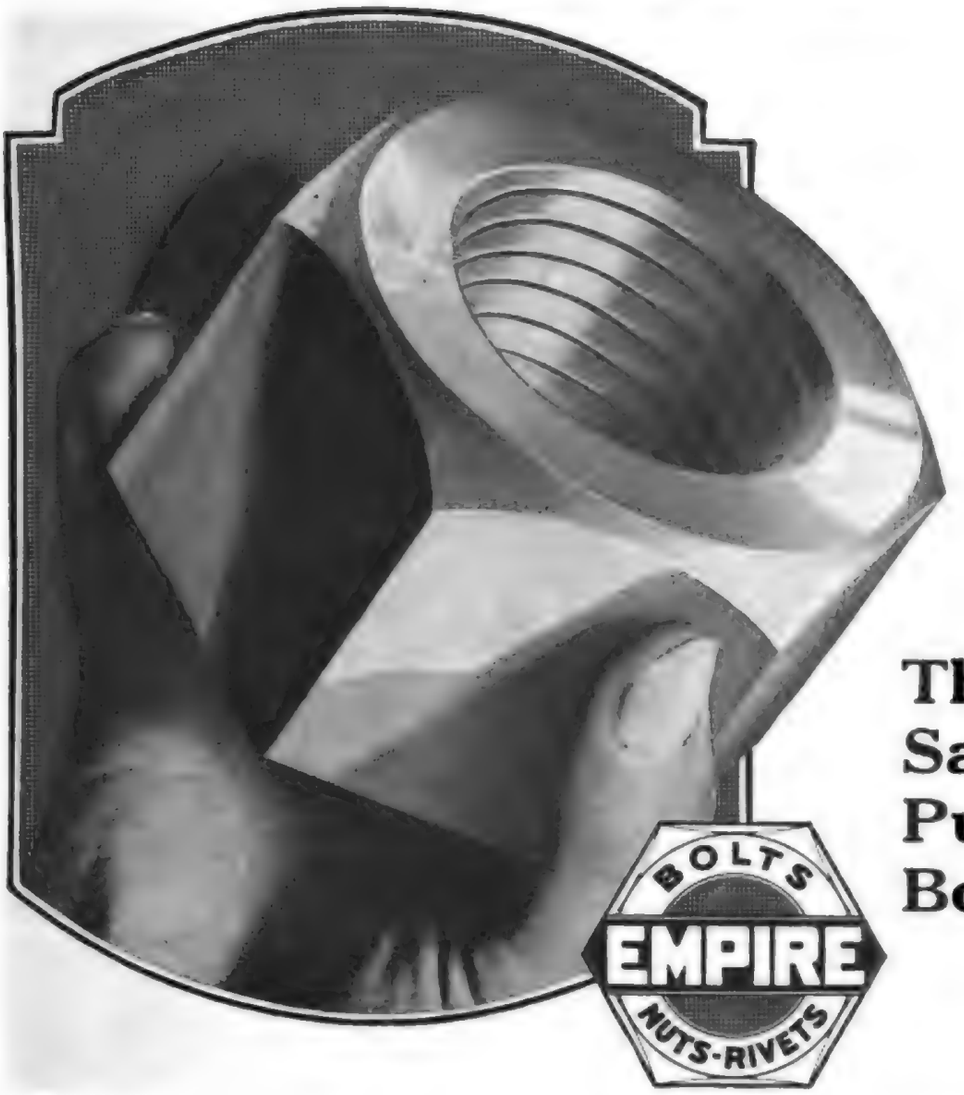
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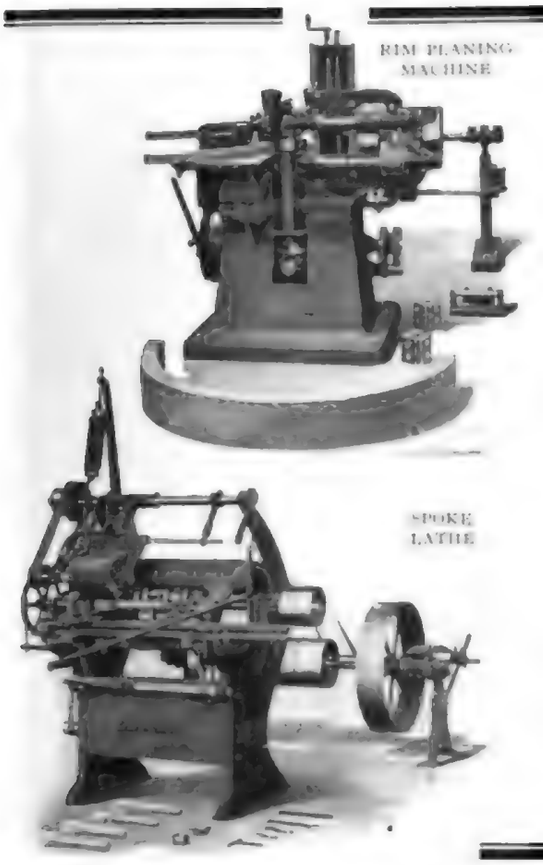
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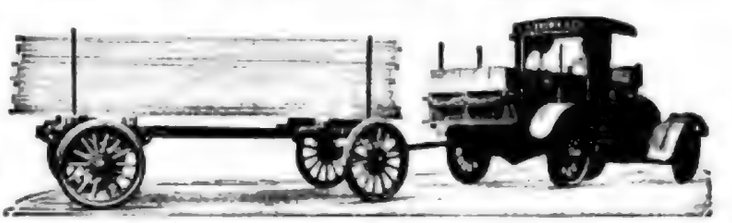
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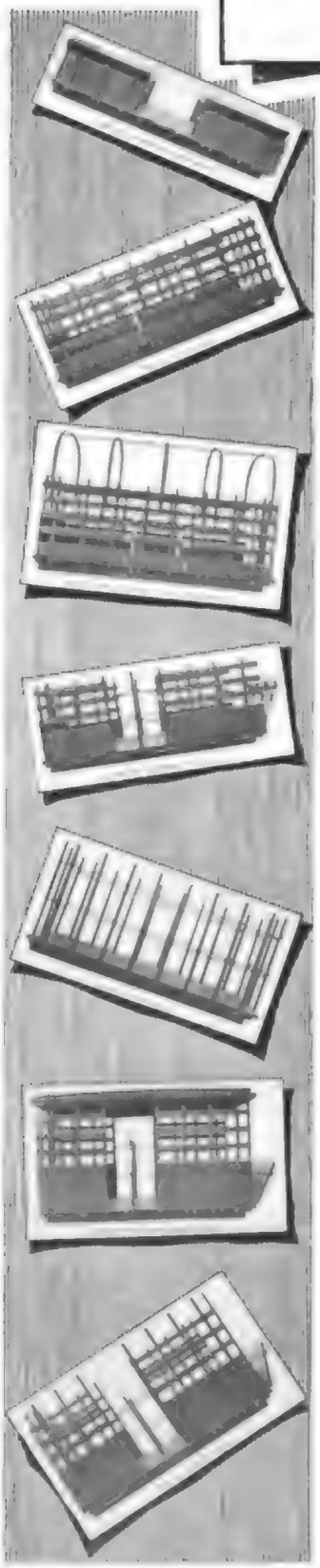
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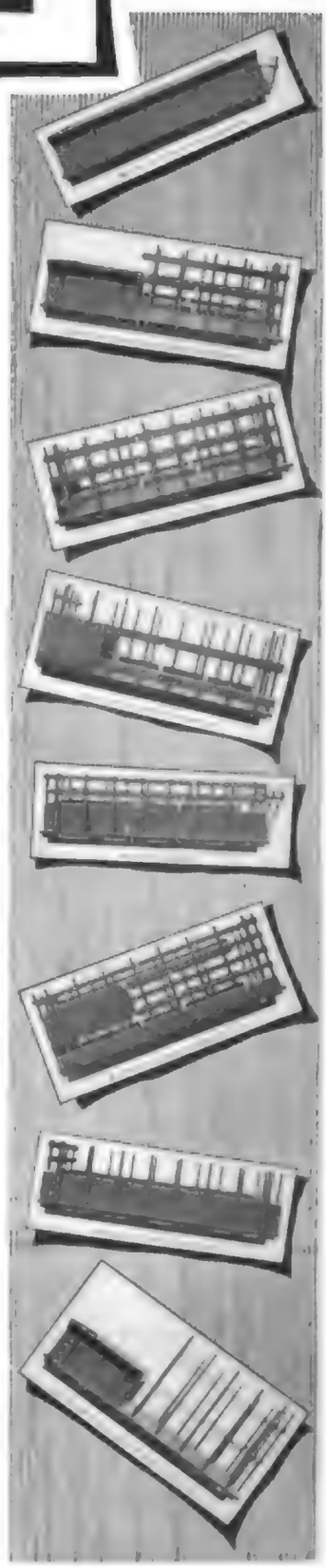
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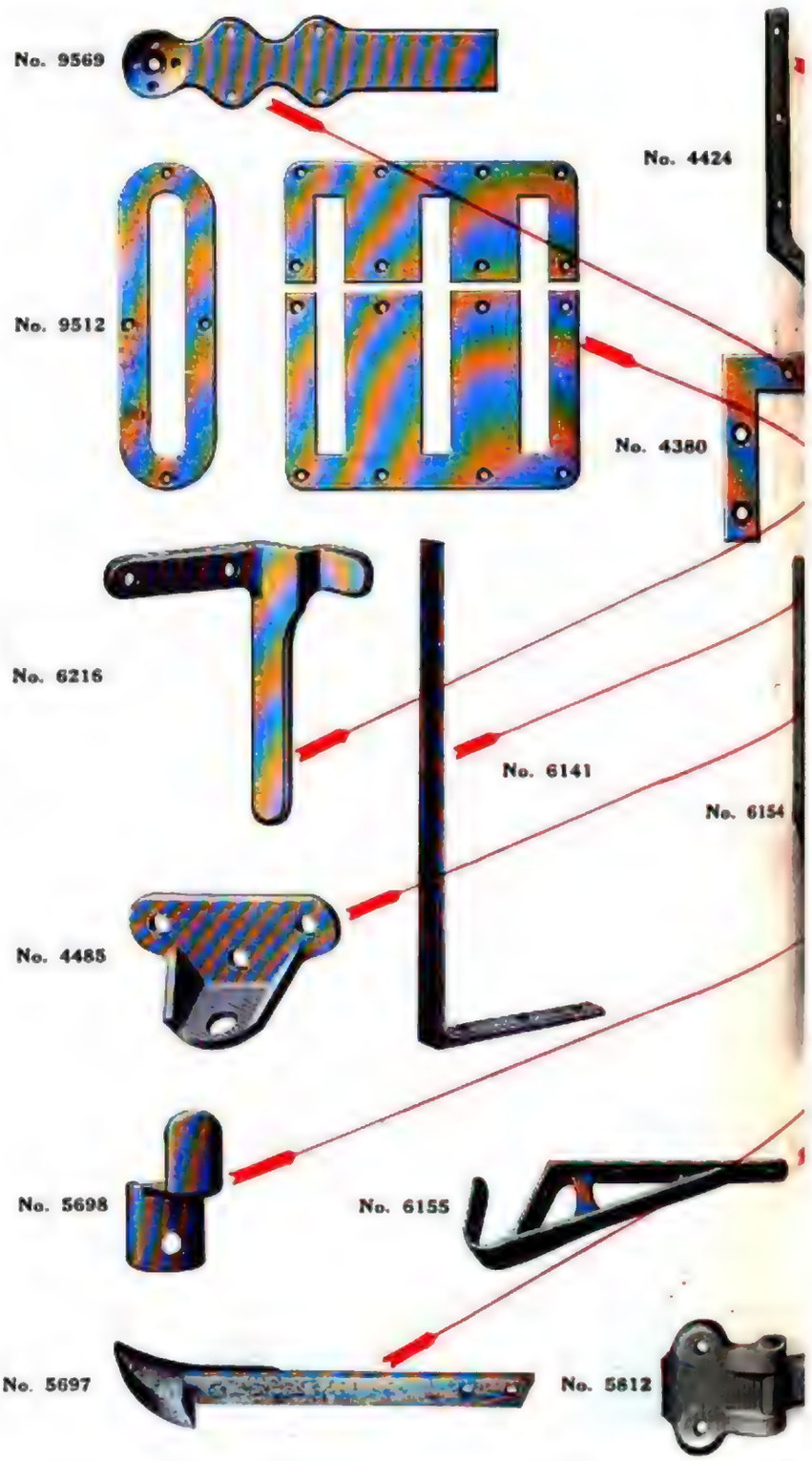
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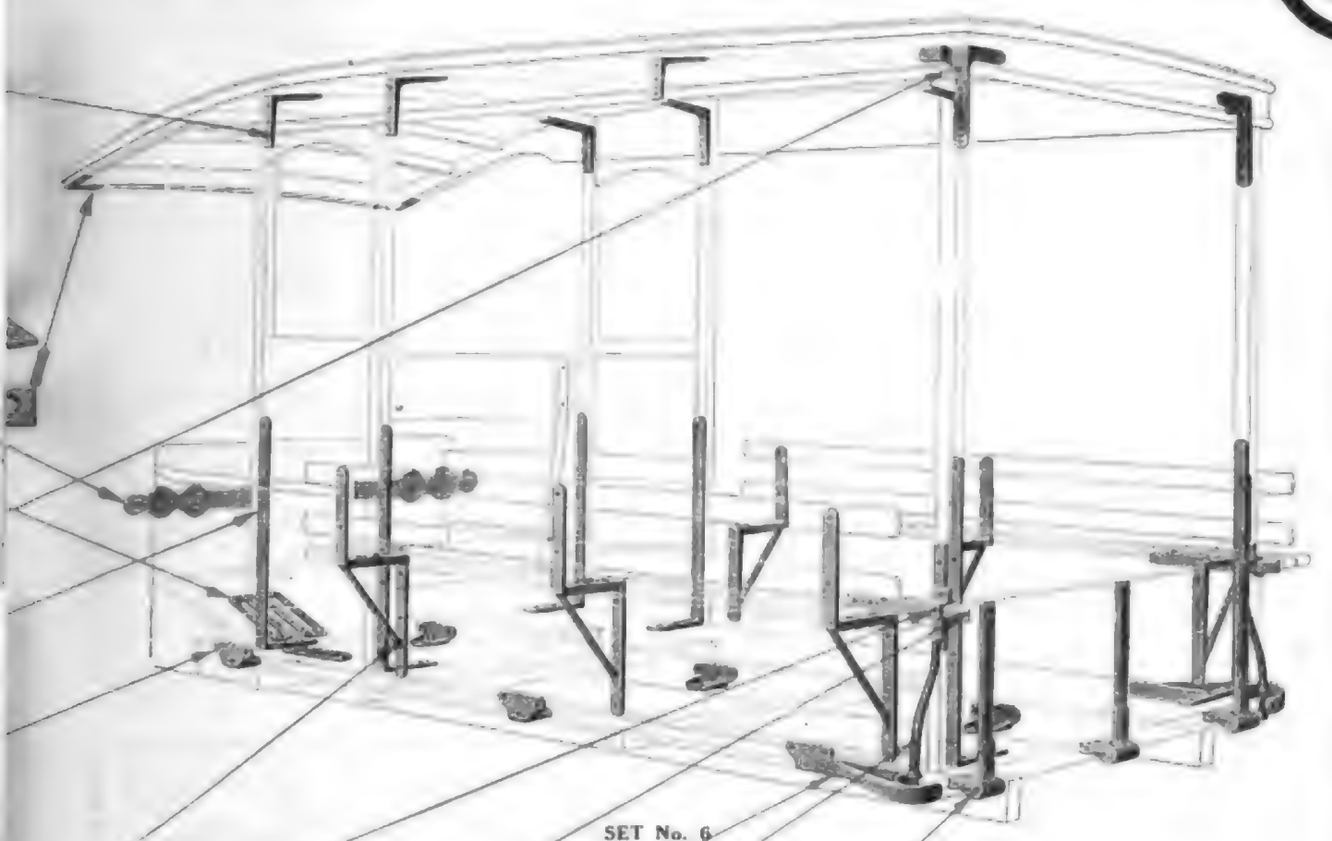
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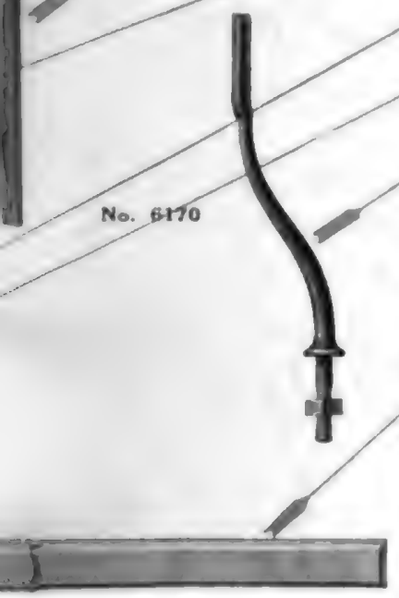
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No. 6170

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2 pieces	5698-A	Endgate Spring Guards	2 pieces	5698-A
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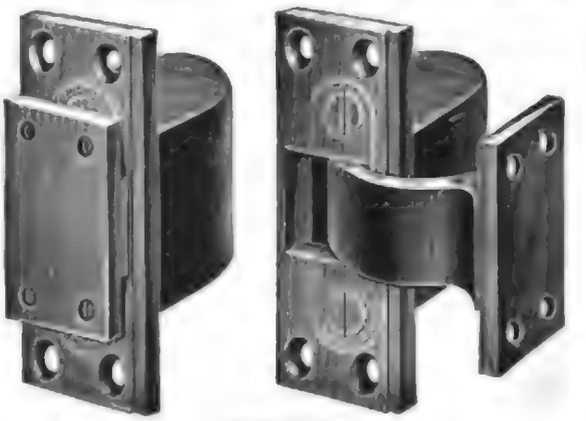
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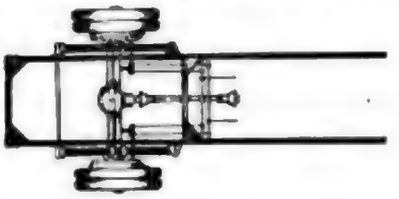
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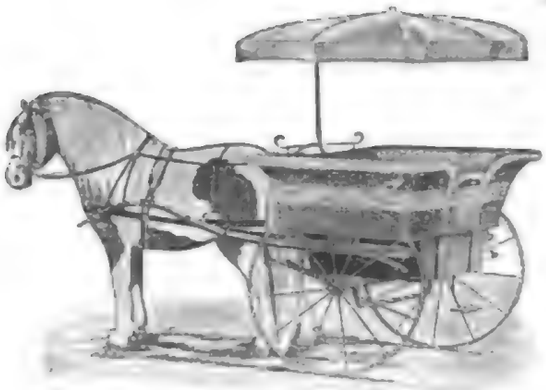
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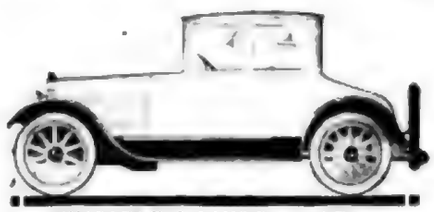
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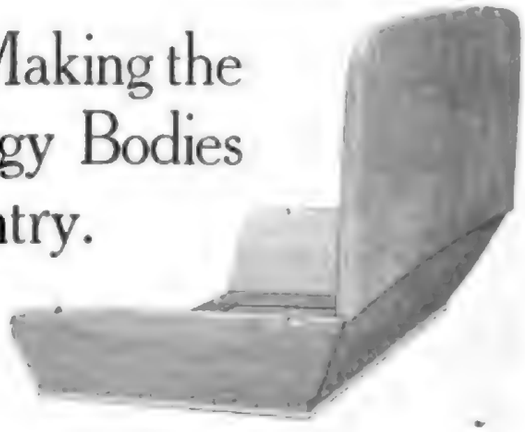
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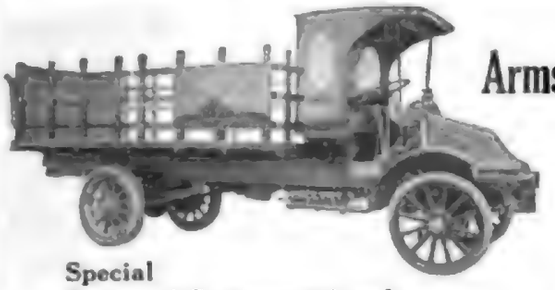
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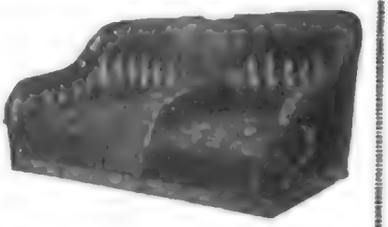
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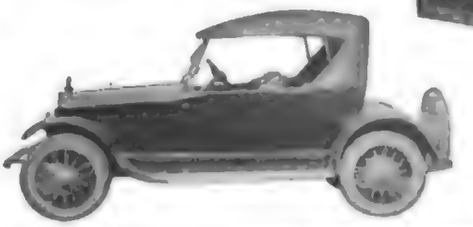
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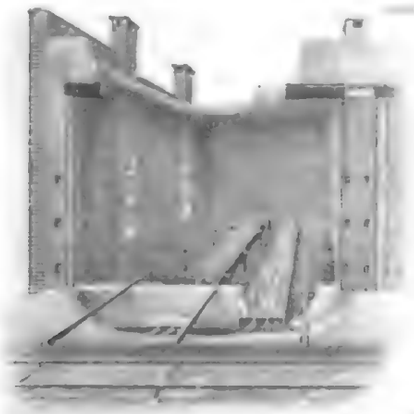




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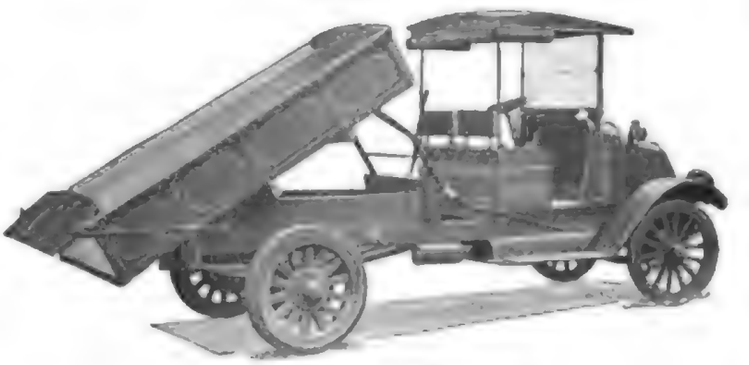
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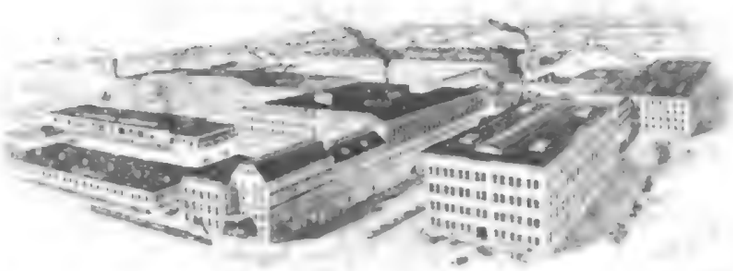
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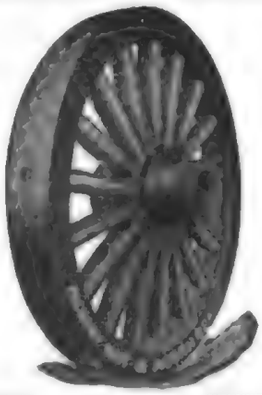
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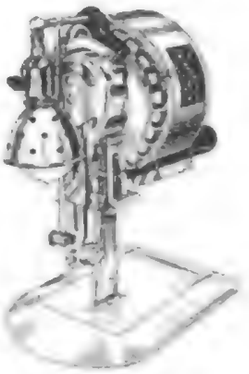
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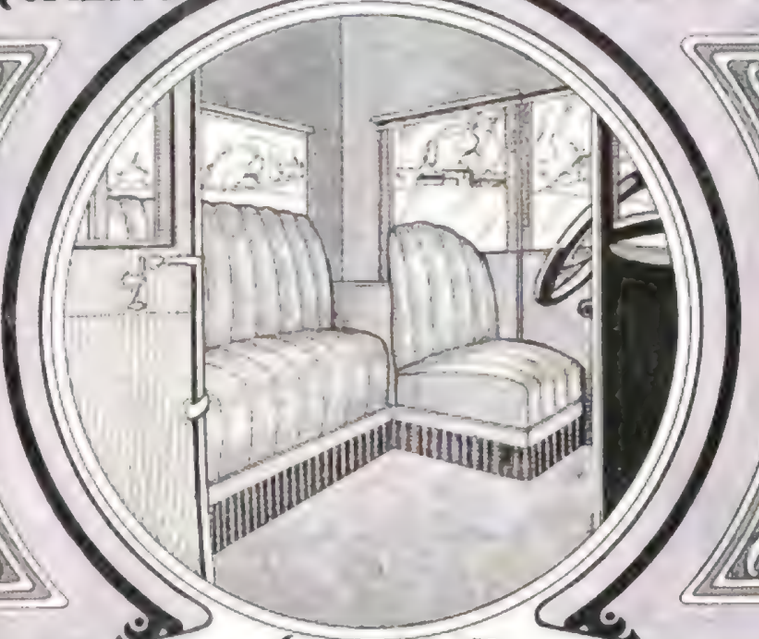
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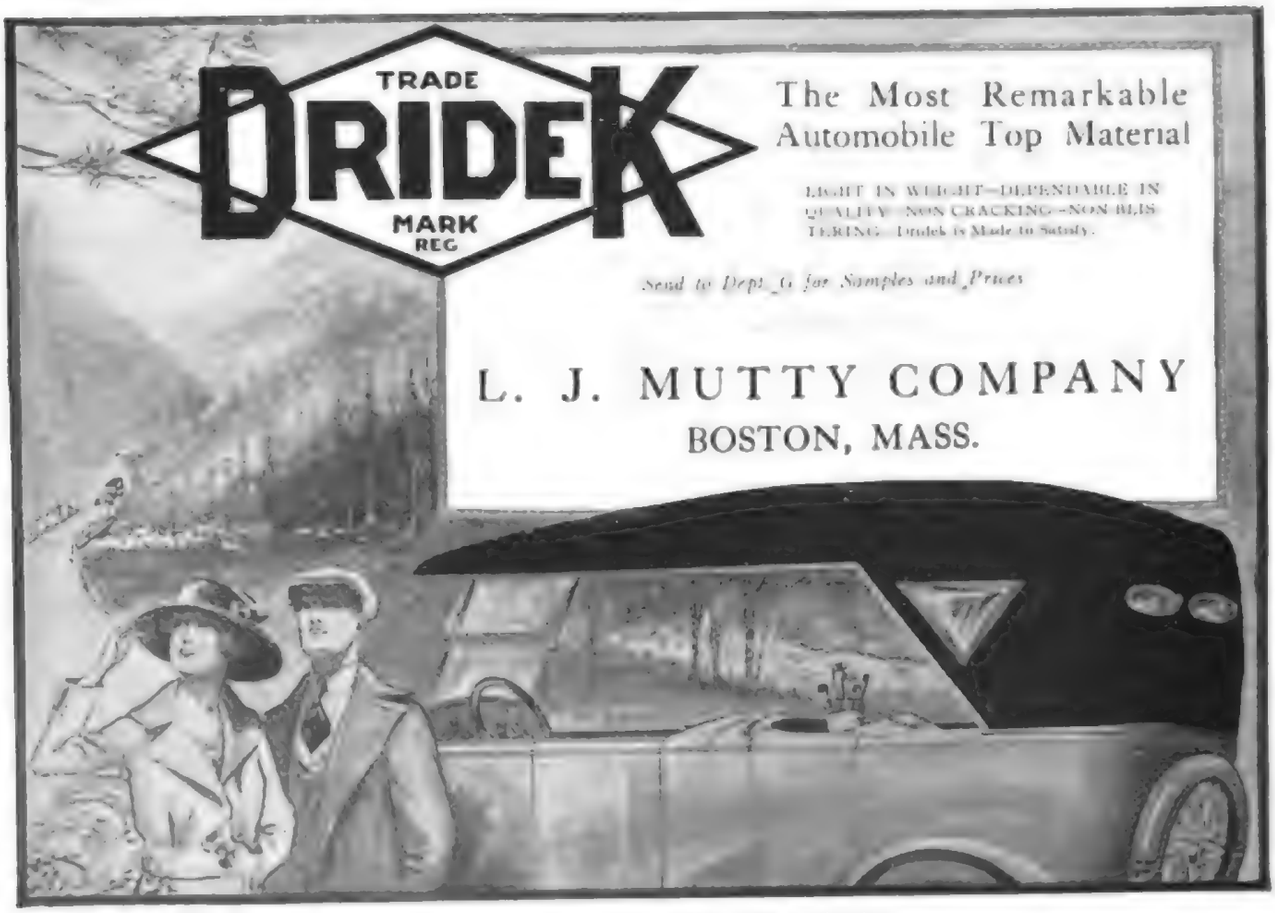
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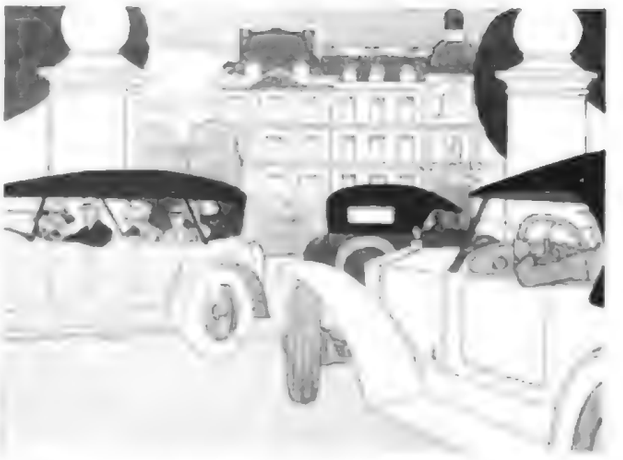
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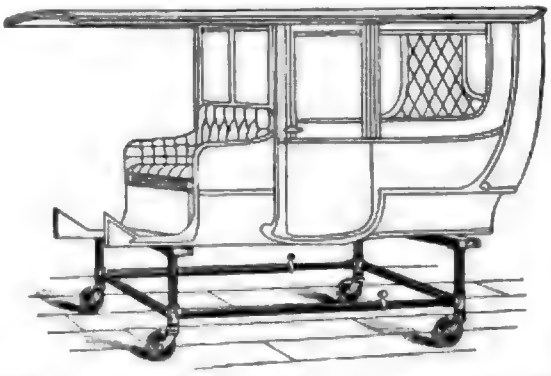
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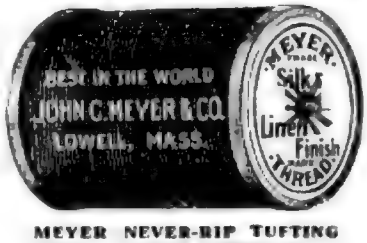
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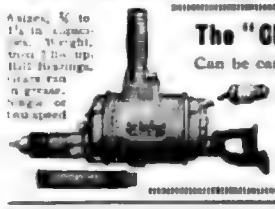


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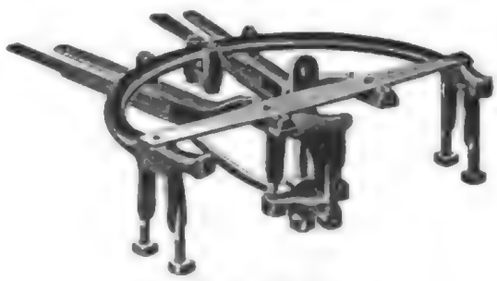
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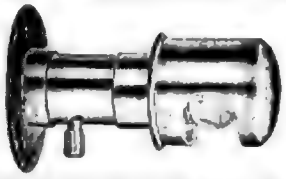
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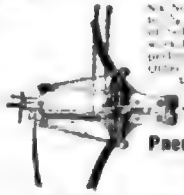
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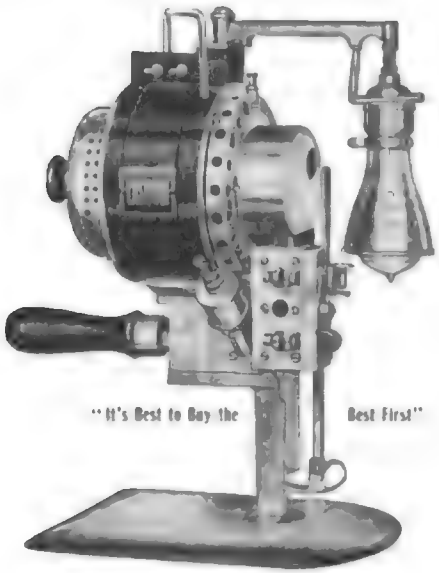
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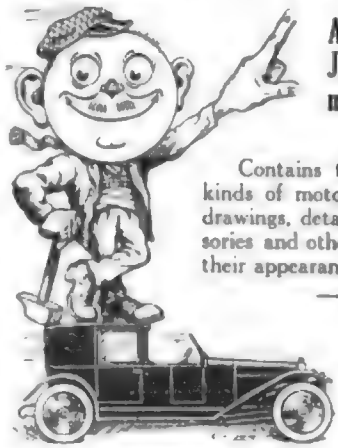
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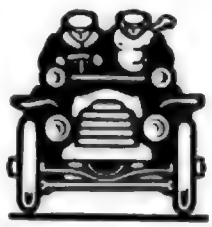
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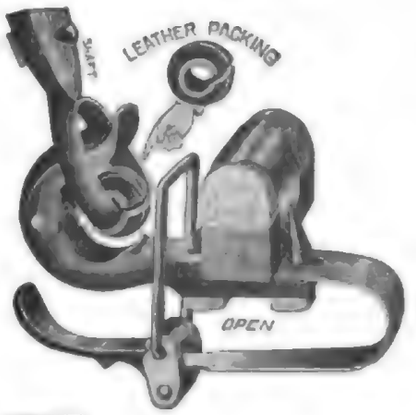
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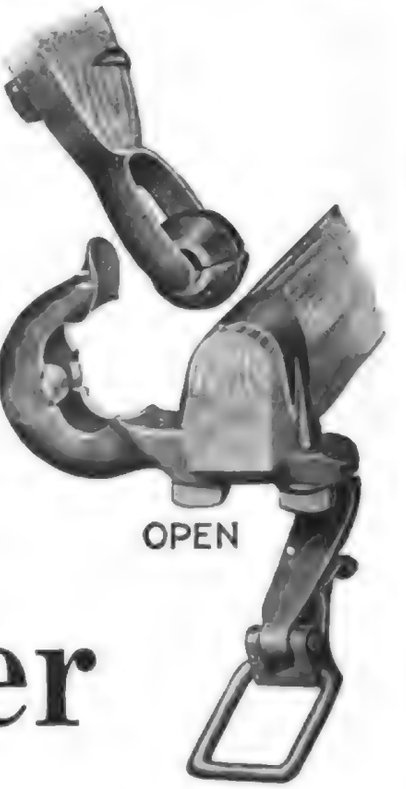
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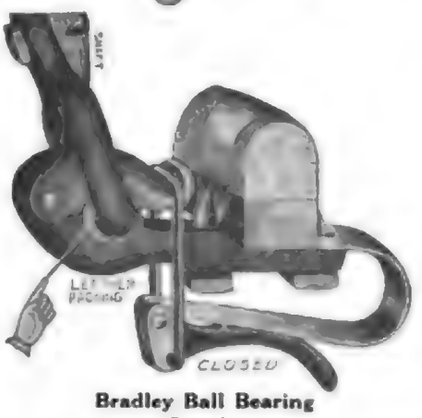
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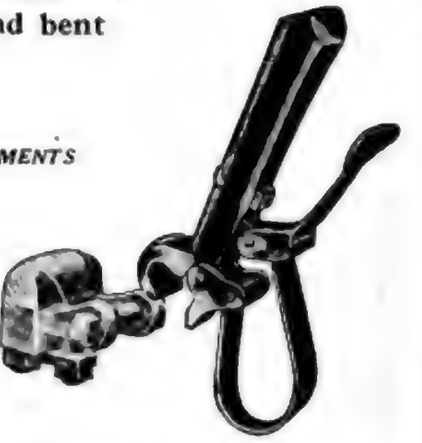
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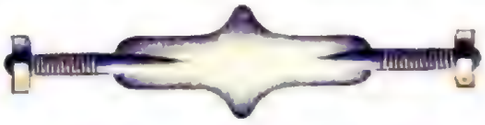
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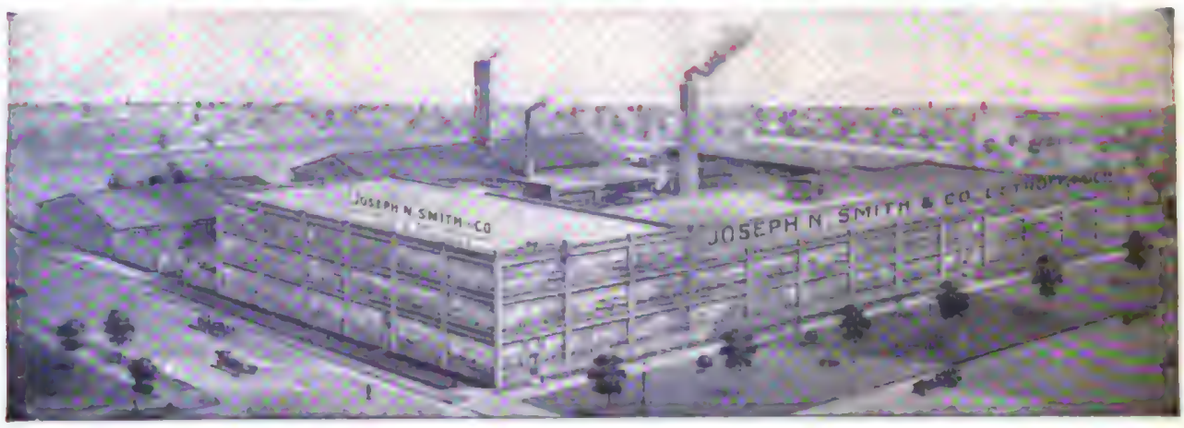


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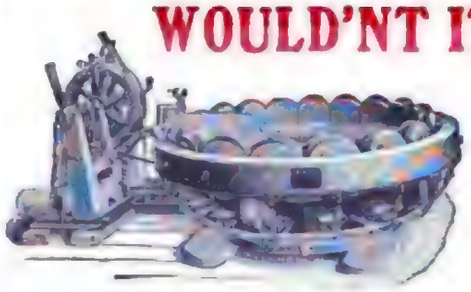
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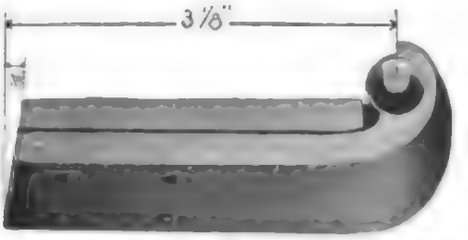
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Some Automobile Show History

By S. A. MILES, Manager New York and Chicago Automobile Shows

The year 1920 sees the 20th National Automobile Show celebrating the twentieth anniversary of the automobile industry in America as an actual industry. The idea of the motor car itself is hundreds of years older. Back in the thirteenth century a far-sighted old gentleman risked ridicule with the prophecy that the day would come when a horseless chariot would be invented which would run as fast as a horse. One of the first contraptions that appeared in fulfillment of this rash prediction—some six hundred years too late, by the way, to give the poor prophet his satisfaction—was regarded as enough of a freak to be exhibited in 1890 with the rest of them by P. T. Barnum, who thus has the credit of putting on the first automobile "show."

Madison Square Garden saw the first real automobile show in 1900, during the week November 3-10. Even then, people were afraid to go too close to the curious contrivances. I recollect that a flat, oval track was built in the arena at the Garden upon which makers might prove to the public that the things would run. People took care to sit in the galleries during demonstrations, and those who wanted to cross the track did so over a bridge. A sensation was created by the discovery that cars were able to climb a wooden hill, which had been made on the roof of the Garden. To run down, of course, but really to climb up! That they did not go too fast we may know from the fact that most of them were single cylinders.

There were 31 exhibitors of complete motor cars at that first show, and 20 of parts and accessories. It seems a far cry from those few dauntless rattle traps to the 87 passenger cars, 75 truck and 284 accessories of this twentieth show, but the development has been consistent and logical.

At the second national show held in the Garden in the first week of November, 1901, there were 51 exhibitors, the track was omitted, and demonstrations were given on the basement floor and around the block occupied by the Garden.

To control the development of the fast-growing industry the National Association of Automobile Manufacturers was organized and it was decided to hold the national exhibition at the beginning of the year instead of at the close, and to have it managed by a committee on which the N. A. A. M., the Automobile Club of America—under whose auspices the first show was held—and the Garden company should each be represented. After that progress went on at express speed.

There was no show in 1902, but in January, 1903, the third show was held with 150 exhibitors represented. By 1905 the number of exhibitors had increased to 250, and several applications had to be refused for lack of space. With the 1905 show the contract between the N. A. A. M., the Madison Square Garden and the Automobile Club of America expired, and the Association of Licensed Automobile Manufacturers obtained a lease of the Garden for several years, with an option of renewing it.

With the expansion of the industry, each year saw more exhibitors represented at the show. In the exposition held January 8-15, 1910, there were 323, of which 54 showed cars, 23 motorcycles, and 246 accessories. In 1913 both Madison Square Garden and Grand Central Palace were obtained to afford space for the 545 exhibitors. During the first week of the show a total of 93 makers of passenger cars, 25 of motorcycles, and 372 of accessories had displays in the two buildings and during the second week 66 manufacturers of commercial vehicles exhibited their products.

As the war went on and we became more deeply involved in it, the automobile industry, like every other, devoted itself almost exclusively to production for war purposes. During the dark days of 1918 it was decided by the National Automobile Chamber of Commerce that no show should be held in January, 1919. After the armistice was signed the manufacturers reiterated their decision because factories were too firmly on a war basis to be immediately reconverted to peace-time uses. The automobile dealers, however, planned to carry on unbroken the tradition of the automobile show. With the co-operation of manufacturers the annual display took place in Madison Square Garden and the 69th Regiment Armory.

Back to Normal Conditions

Well on the way to normal conditions, with factories producing at the rate of 2,000,000 cars a year, and demand far exceeding supply at that, the industry this year will celebrate its twentieth birthday in a big "double-header" show. Passenger cars and trucks will be shown during the same week, January 3-10, respectively, in Grand Central Palace and Eighth Coast Artillery Armory. Marking the opening of a new era of service for the automotive vehicle a series of conferences on motor transportation has been incorporated with the motor truck division of the show. Eighty-seven makes of passenger cars, 75 of trucks, and 284 of accessories will be on display at this year's New York show.

An Important Announcement

The gasoline engine proved a new means for propelling carriages, and while nearly every one is familiar with the development of the engine and chassis, which have brought the automobile up to its present style of utility, the parts that go with the engine and chassis have received comparatively little attention from engineers.

There are a number of units that go to make the automobile complete in convenience,

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comfort and appearance. These parts, for a number of years, received very little attention. The designers and manufacturers were concentrating upon the perfection of the engine. This has now been accomplished and the result is that most of the attention is now focused on the body and the other parts of the car.

Kingston Forbes, a competent body engineer, has made a study of the designs of these body features, and outlines the results of his studies in a series of articles which will be run serially in the Body Department of THE VEHICLE MONTHLY during the year 1920. There are very few such comprehensive treatments of the art of body designing, and it is hoped that the information contained in this series will prove of interest to the student, engineer and layman who are interested in the automobile.

The first instalment of Mr. Forbes' instructive articles begins in this number.

Drafting School Opened in Detroit

When the Technical School for Automobile Body Makers and Draftsmen in New York City closed its doors in 1918, it was a disappointment to many men in the trade who were graduates or who wished to study there. To all such comes the good news that the school has reopened in Detroit as a part of the Cass Technical High School.

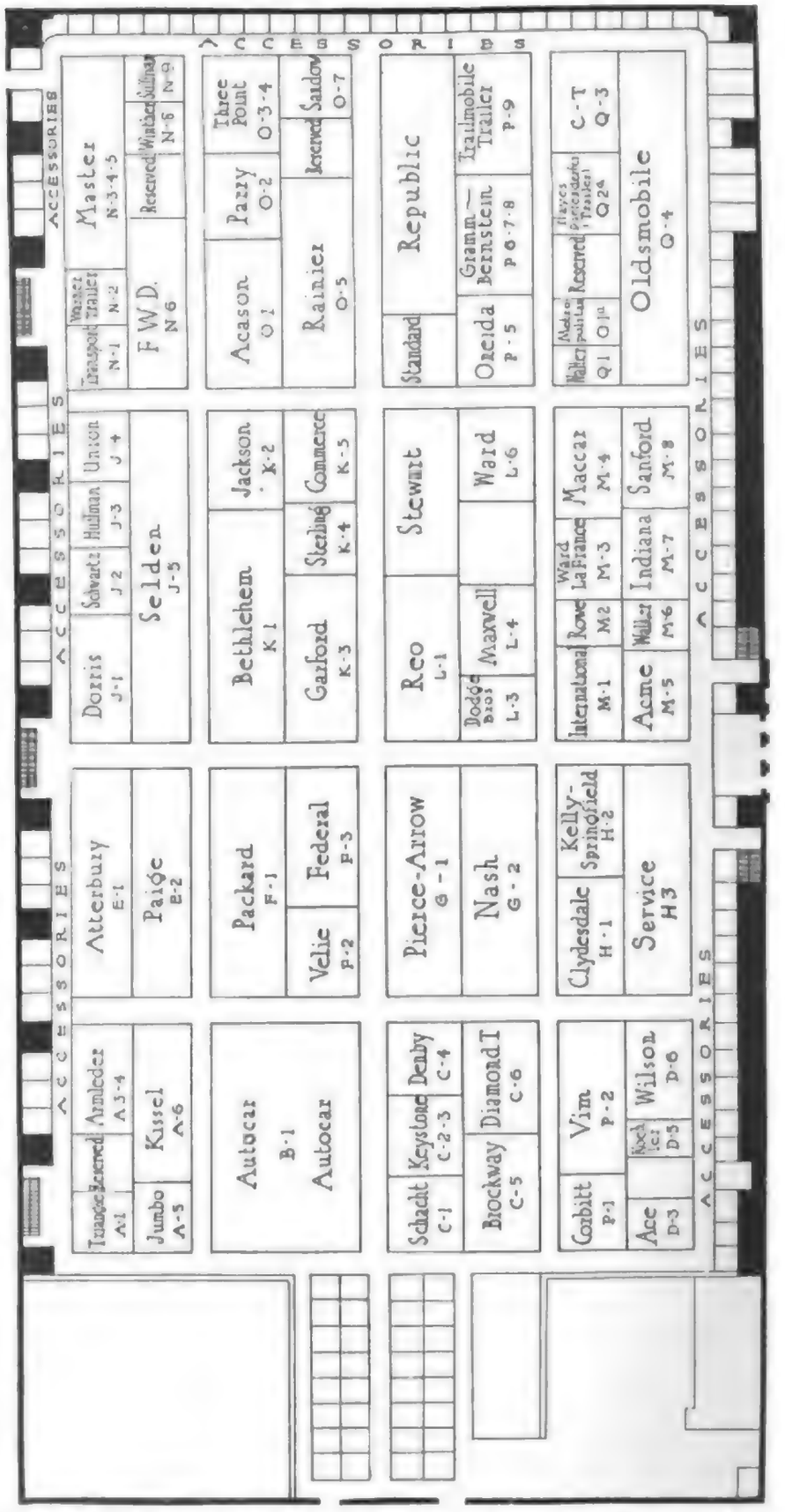
It is conducted about the same as it was in New York, with both day and evening classes. These are free to residents of Detroit, but a fee will be charged to others. For further information address: Automobile Body Course, care Cass Technical High School, Detroit, Michigan. The school is in charge of Prof. Andrew F. Johnson, who so successfully conducted the New York institution over a period of many years.

Traffic Truck's Prosperous Year

As a fitting climax to the most prosperous year ever enjoyed by the company, the Traffic Motor Truck Corporation on Thursday, December 11th, asked for and received from hundreds of Traffic motor truck dealers, who attended a two-day convention at the Traffic plant, orders for over $22,000,000 worth of Traffic trucks in less than 22 minutes. The Traffic dealers signified their desire in an open meeting in St. Louis, and as each dealer specified the number of trucks he desired for 1920 his name and address and number of trucks was written on a large blackboard made especially for this occasion.

Gramm-Bernstein at the Show

Among the larger exhibits at the New York motor truck show in the Eighth Coast Artillery Armory, New York, January 3 to 10, will be that of The Gramm-Bernstein Motor Truck Co., Lima, Ohio. The company has engaged a large space, Section P, 6-7-8, where they will be pleased to meet dealers and the general public.



WHERE THE TRUCKS ARE TO BE DISPLAYED AT THE MOTOR TRUCK SHOW, 8TH COAST ARTILLERY ARMORY, JANUARY 3 TO 10.

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National Auto Shows Bigger Than Ever

That the New York and Chicago automobile shows will constitute a more complete exposition of the automotive industry than ever before in the successful history of these shows is apparent from a statement issued by S. A. Miles, manager of the National Automobile Shows, that there will be on display 87 different makes of passenger cars, 70 of motor trucks and 284 accessories.

Of the passenger car exhibitors 84 have entered both the New York and the Chicago shows; two will appear in Chicago only and one in New York only. At the New York Motor Truck Show no less than 63 different makes of trucks will be displayed, while to date 50 makes have secured space for the Chicago truck show.

The New York passenger car and truck shows will be held during the week of January 3-10, while the Chicago show will be held January 24-31. In New York passenger cars will be exhibited on four floors of Grand Central Palace, while the truck exhibit will be held in the Eighth Coast Artillery Armory, the largest in the United States. The Chicago passenger car show will be held in the Coliseum and Armory, while trucks will be displayed in the International Amphitheatre. In addition to this comprehensive display of cars and accessories a series of conferences on transportation problems has been incorporated in the motor truck divisions of the shows. These conferences have aroused general interest as a clearing house for ideas gained during the war and reconstruction periods and made concrete in new models of cars and accessories on display.

Motor transportation as an auxiliary to the railroad, is one of the topics of special timeliness to be discussed during the conferences. Contrary to the general belief the motor truck is not competing with the railways, but is aiding the roads to solve a national transportation problem that is really serious. Motor trucks are replacing railroads on the short haul which has been unprofitable and in many instances extravagant transportation. It is demonstrating to



S. A. MILES
General Manager of the National Automobile and Truck Shows



ALFRED REEVES
General Manager of the National Automobile Chamber of Commerce



GRAND CENTRAL PALACE
NEW YORK CITY
where the Passenger Car Show will be staged Jan. 3-10, 1920



EIGHTH COAST ARTILLERY ARMORY, NEW YORK CITY
Where the National Motor Truck Show will be held January 3 to 10, 1920

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railroads that it can pick up and haul from the branch receiving stations in and around a large city to the main or outbound station considerably faster and cheaper than the switch engine.

The truck has a great advantage over the branch line railroad in that it has no expensive initial investment, no payments to be made for right of way, no bridges or grades to construct. If the truck or trucks do not pay, being a mobile unit they can be transferred elsewhere. Were it easy, practical or profitable many railroad tracks would be torn up and replaced elsewhere on many branch lines today.

Utilization of motor trucks for feeders to the main line railways, and for short haul work, will conserve vast amounts of coal and fuel. It is estimated that 25 per cent. of the coal mined in this country is consumed by the railroads. The railway traffic for a given year was one trillion ton-miles. To transport this tonnage required 100,000,000 tons of coal and 40,000,000 barrels of fuel oil, and of this 12 per cent. of the coal was consumed for railway purposes. With the construction of terminals and greater use of trucks to feed these and the main lines, the elimination of expensive and impractical equipment, coal-consuming equipment, will be feasible.

Construction of large capacity trucks, of trailers, and the use of demountable bodies that permit of the truck shuttling back and forth, as well as scientific loading apparatus, spells decreased transportation costs. Motor highway transportation engineers have made rapid progress during the past year and practical demonstration of the devices will be a feature of the Motor Truck Show. The New York show will be held in Eighth Coast Artillery Armory, the Chicago show in the International Amphitheatre.

The New York Truck Show

Despite the fact that the Eighth Coast Artillery Armory, in which the National Motor Truck Show will be held January 3 to 10, has more than 150,000 square feet of unbroken floor space and is the largest armory in the country, there will not be one inch of exhibition space unoccupied when the big New York truck display opens. Each day more concerns are added to the already long list of exhibitors, and as we go to press there is very little floor space left unallotted. This can be taken as an indication that truck manufacturers are looking forward to 1920 as the big truck year and are planning to open their selling campaigns at the New York truck show. The leading makers of the country are listed to exhibit their products at this greatest of all truck exhibitions, which will be held under the auspices of the National Automobile Chamber of Commerce. A large number of accessory makers will exhibit at the truck shows this year at both New York and Chicago.

Unusual interest is being shown in the monster transportation conference which will be a part of the truck show. It will be held in the auditorium of the armory and judg-

Passenger Car Exhibitors at New York and Chicago Shows

NOTE.—All exhibitors will appear in both shows unless otherwise noted. Exhibitors marked "C" will enter Chicago Show only. Exhibitors marked "N. Y." will enter New York Show only.

NAME	COMPANY	ADDRESS
Allen	Allen Motor Co.	Columbus, Ohio
American Beauty	Pan American Motors Corporation	Decatur, Ill
Anderson	Anderson Motor Co.	Rock Hill, S. C.
Apperson	Apperson Bros. Auto Co.	Kokomo, Ind.
Auburn	Auburn Automobile Co.	Auburn, Ind.
Biddle	Biddle Motor Car Co., Inc.	Germantown and Sedgley Ave., Philadelphia
Briscoe	Briscoe Motor Corporation	Jackson, Mich.
Buick	Buick Motor Co.	Flint, Mich
Cadillac	Cadillac Motor Car Co.	Detroit, Mich
Case	J. I. Case T. M. Co.	Racine, Wis.
Chalmers	Chalmers Motor Co.	Detroit, Mich.
Chandler	Chandler Motor Car Co.	Cleveland, Ohio
Chevrolet	Chevrolet Motor Co.	New York, N. Y.
Cleveland	Cleveland Automobile Co.	Cleveland, Ohio
Cole	Cole Motor Car Co.	Indianapolis, Ind.
Columbia	Columbia Motors Co.	Detroit, Mich
Comet	Comet Automobile Co.	156-60 S. Water St., Decatur, Ill.
Commonwealth	Commonwealth Motors Co.	326 W. Madison St., Chicago
Crow-Elkhart	Crow-Elkhart Motor Co.	Elkhart, Ind
Davis	Geo. W. Davis Motor Car Co.	Richmond, Ind
Detroit-Electric	Anderson Electric Car Co.	Detroit, Mich.
Dixie Flyer	Kentucky Wagon Co.	3d and K Sts. and L.N.R.R., Louisville, Ky.
Dodge Bros.	Dodge Bros.	Detroit, Mich.
Dorris	Dorris Motor Car Co.	St. Louis, Mo.
Dort	Dort Motor Car Co.	Flint, Mich.
Elcar	Elkhart Carriage & Motor Car Co.	Elkhart, Ind.
Elgin	Elgin Motor Car Co.	Chicago, Ill.
Fiat	F. I. A. T.	New York City
Franklin	H. H. Franklin Mfg. Co.	Syracuse, N. Y.
Grant	Grant Motor Car Corporation	Cleveland, Ohio
Haynes	Haynes Automobile Co.	Kokomo, Ind.
Hollier	Lewis Spring & Axle Co.	Chelsea, Mich.
Holmes	Holmes Automobile Co.	Canton, Ohio
Hudson	Hudson Motor Car Co.	Detroit, Mich.
Hupmobile	Hupp Motor Car Corporation	Detroit, Mich.
Jackson	Jackson Automobile Co.	Jackson, Mich
Jordan	Jordan Motor Car Co.	Cleveland, Ohio
King	King Motor Car Co.	Detroit, Mich.
Kissel Kar	Kissel Motor Car Co.	Hartford, Wis.
Kline Kar (N.Y.)	Kline Car Corporation	Richmond, Va.
Leach (C)	Leach-Biltwell Co.	Los Angeles, Calif.
Lexington	Lexington Motor Co.	Connersville, Ind.
Liberty	Liberty Motor Car Co.	Detroit, Mich.
McFarlan	McFarlan Motor Co.	Connersville, Ind.
Maibohm	Maibohm Motors Co.	Sandusky, Ohio
Marmon	Nordyke & Marmon Co.	Indianapolis, Ind.
Maxwell	Maxwell Motor Co.	Detroit, Mich.
Mercer	Mercer Automobile Co.	Trenton, N. J.
Metz	Metz Company	Waltham, Mass.
Milburn Electric	Milburn Wagon Co.	Toledo, Ohio
Mitchell	Mitchell Motors Co.	Racine, Wis.
Moline-Knight	Root & Van Dervoort Eng. Co.	East Moline, Ill.
Monitor	Monitor Motor Car Co.	402 Mt. Vernon Ave., Columbus, Ohio
Monroe (C)	William Small Co.	Indianapolis, Ind.
Moon	Moon Motor Car Co.	St. Louis, Mo.
Nash	Nash Motors Co.	Kenosha, Wis.
National	National Motor Car & Vehicle Corporation	Indianapolis, Ind.
Oakland	Oakland Motor Car Co.	Pontiac, Mich.
Oldsmobile	Olds Motor Works	Lansing, Mich.
Olympian	Olympian Motors Co.	Pontiac, Mich.
Overland	Willys-Overland Co.	Toledo, Ohio
Owen-Magnetic	Baker R. & L. Co.	Cleveland, Ohio
Packard	Packard Motor Car Co.	Detroit, Mich.
Paige	Paige-Detroit Motor Car Co.	Detroit, Mich.
Paterson	W. A. Paterson Co.	Flint, Mich.
Peerless	Peerless Motor Car Co.	Cleveland, Ohio
Pierce-Arrow	Pierce-Arrow Motor Car Co.	Buffalo, N. Y.
Pilot (C)	Pilot Motor Car Co.	Richmond, Ind.
Premier	Premier Motor Corporation	Indianapolis, Ind.
Reo	Reo Motor Car Co.	Lansing, Mich.
Roamer	Barley Motor Car Co.	Kalamazoo, Mich.
Saxon	Saxon Motor Car Corporation	Detroit, Mich.
Sayers	Sayers & Scovill Co.	Cincinnati, Ohio
Scripps-Booth	Scripps-Booth Corporation	Detroit, Mich.
Standard	Standard Steel Car Co.	Pittsburgh, Pa.
Stanley	Stanley Motor Carriage Co.	Newton, Mass.
Stearns-Knight	F. B. Stearns Co.	Cleveland, Ohio
Stephens Six	Moline Plow Co., Stephens Motor Branch	Moline, Ill.
Stevens-Duryea	Stevens Duryea Co.	Chicapee Falls, Mass.
Studebaker	Studebaker Corporation	South Bend, Ind.
Stutz	Stutz Motor Co.	Indianapolis, Ind.

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ing from present indications, the atendance at this conference will be large. John R. Eustis, who is in charge of the conference, has received word from factory heads, traffic managers, shippers, salesmen and dealers from various parts of the country, asking for information relative to the subjects to be discussed.

A Review of Motor Transportation

A complete presentation of motor transportation will be given by men who have won recognition for the qualifications to speak authoritatively upon the respective subjects to be discussed at the conference. These subjects will include merchandising of motor trucks, service from every angle, operating costs, proven sales methods, and, in fact, every subject dealing with the motor truck. Motion pictures and lantern slides will be used extensively to illustrate the various talks.

The sessions will be held in the afternoon and evening on each day of the show, so that visitors to the passenger car exhibition, which will be held at Grand Central Palace during the same week, will have an opportunity of visiting the motor truck exhibition during either the afternoon or evening.

The motor truck conference will be repeated at the National Motor Truck Show in Chicago, which follows the New York show. As has been already announced, the motor truck shows will be held simultaneously with the passenger car shows in both New York and Chicago. This is done in order that the thousands of visiting dealers and others interested in motor trucks can visit both sections of the National Show in one week without making two separate trips.

Motor Truck Conference at the New York Show

Hundreds of inquiries about the big transportation conference to be held in connection with the National Motor Truck Show in Eighth Coast Artillery Armory, New York City, January 3-10, have been received by the management from all parts of the country. Interest in transportation problems and in the motor truck as a solution of some of the more pressing of them has become universal lately since the railroad question, fuel shortage and tie-ups of common carriers, because of labor difficulties, have forced upon the public a realization of how vital uninterrupted channels of communication are to human life, the motor truck has become a greater factor than ever before.

It is just this uninterrupted communication which the motor truck stands ready to supply. Emphasis on the war record of the motor truck has been placed ordinarily upon its service abroad. Not enough has been said about its achievement in rapid transportation of essential raw materials and finished products during the days when congestion on the railroads and shortage of coal forced the Fuel Administrator to stop all production by establishing fuelless days.

Broader and more direct opportunities for public service have been afforded to the mo-

Passenger Car Exhibitors—(Continued)

Templar—Templar Motors Corporation.....Cleveland, Ohio
Velie—Velie Motors Corporation.....Moline, Ill
Westcott—Westcott Motor Car Co.....Springfield, Ohio
Willys-Knight—Willys-Overland Co.....Toledo, Ohio
Winton—Winton Co.....Cleveland, Ohio

Motor Truck Exhibitors at New York and Chicago Shows

NOTE—All exhibitors will appear in both shows unless otherwise noted. Exhibitors marked "C" will enter the Chicago Show only. Exhibitors marked "N. Y." will enter the New York Show only.

NAME	COMPANY	ADDRESS
Acason	Acason Motor Truck Co	431 Brooklyn Ave., Detroit, Mich.
Acme	Acme Motor Truck Co	Cadillac, Mich.
All-American (C)	All-American Truck Co	Sacramento Blvd., Chicago, Ill
Ace	American Motor Truck Co	Newark, Ohio
Armleder (C)	The O. Armleder Co	Plum, Charles and 12th Sts., Cincinnati, Ohio
Armleder (N.Y.)	Armleder Sales & Service Co	332 Ave. B, New York
Atterbury	Atterbury Motor Car Co	Buffalo, N. Y.
Autocar	Autocar Co	Ardmore, Pa
Bethlehem	Bethlehem Motors Corporation	Allentown, Pa.
Brockway (N.Y.)	Brockway Motor Truck Co	Cortland, N. Y.
Clydesdale	Clyde Cars Co	Clyde, Ohio
Commerce (N.Y.)	Commerce Motor Car Co	Detroit, Mich.
Corbitt (N.Y.)	Corbitt Motor Truck Co	Henderson, N. C.
C. T. (N.Y.)	Commercial Truck Co. of America	27th and Brown Sts., Philadelphia
Defiance	Turnbull Motor Truck & Wagon Company	Defiance, Ohio
Denby	Denby Motor Truck Co	Detroit, Mich.
Dependable (C)	Dependable Truck & Tractor	Galesburg, Ill.
Diamond T	Diamond T Motor Car Co	Chicago, Ill.
Dodge Brothers	Dodge Brothers	Detroit, Mich.
Dorris	Dorris Motor Car Co	St. Louis, Mo.
Federal	Federal Motor Truck Co	Detroit, Mich
F. W. D. (N.Y.)	Four Wheel Drive Motor Truck	Wehberville, Mich.
Garford	Garford Motor Truck Co	Lima, Ohio
Gary (C)	Gary Motor Truck Co	Gary, Ind.
Gramm-Bernstein	Gramm-Bernstein Motor Truck	Lima, Ohio
Hendrickson (C)	Hendrickson Motor Truck Co	3538 S. Wabash Ave., Chicago
Huffman	Huffman Bros. Motor Co	Elkhart, Ind.
Indiana	Indiana Truck Corporation	Marion, Ind
International	International Harvester Corporation	Chicago, Ill.
Jackson	Jackson Automobile Co	Jackson, Mich.
Jumbo	Nelson Motor Truck Co	Saginaw, Mich
Kalamazoo (C)	Kalamazoo Motors Corporation	Kalamazoo, Mich.
Kelly (N.Y.)	Kelly & Springfield Motor Truck	Springfield, Ohio
Keystone (N.Y.)	Commercial Car Unit Co	18th St. and Glenwood Ave., Philadelphia
Kissel	Kissel Motor Car Co	Hartford, Wis.
Koehler (N.Y.)	H. J. Koehler Motors Corporation	155 Ogden St., Newark, N. J.
Maccar	Maccar Truck Co	Scranton, Pa.
Master	Master Trucks, Inc	3132 S. Wabash Ave., Chicago
Maxwell	Maxwell Motor Co	Detroit, Mich.
Nash	Nash Motors Co	Kenosha, Wis.
Obenchain-Boyer (C)	Obenchain-Boyer Co	Logansport, Ind.
Oldsmobile	Olds Motor Works	Lansing, Mich.
Oneida	Oneida Motor Truck Co	Green Bay, Mich.
Packard	Packard Motor Car Co	Detroit, Mich.
Paige	Paige-Detroit Motor Car Co	Detroit, Mich.
Parker (C)	Parker Motor Truck Co	604 Linus St., Milwaukee, Wis.
Patriot (C)	Helb Motors Co	Lincoln, Neb.
Pierce-Arrow	Pierce-Arrow Motor Car Co	Buffalo, N. Y.
Rainier	Rainier Motor Corporation	Flushing, L. I., N. Y.
Reo	Reo Motor Car Co	Lansing, Mich.
Republic	Republic Motor Truck Co	Alma, Mich.
Rowe (N.Y.)	Rowe Motor Mfg. Co	Lancaster, Pa.
Sandow	Sandow Motor Truck Co	Chicago
Sanford (N.Y.)	Sanford Motor Truck Co	Syracuse, N. Y.
Schact	G. A. Schact Motor Truck Co	Cincinnati, Ohio
Schwartz (N.Y.)	Schwartz Motor Truck Co	Reading, Pa.
Selden	Selden Motor Vehicle Co	Rochester, N. Y.
Service (C)	Service Motor Truck Co	Wabash, Ind.
Standard	Standard Motor Truck Co	Detroit, Mich.
Sterling (N.Y.)	Sterling Motor Truck Co	Milwaukee, Wis.
Stewart	Stewart Motor Corporation	Buffalo, N. Y.
Sullivan (N. Y.)	Sullivan Motor Truck Corporation	Rochester, N. Y.
Trailmobile	Trailmobile Co	Cincinnati, Ohio
Transport	Transport Truck Co	Mt. Pleasant, Mich.
Three Point (N.Y.)	Three Point Truck Co	Newark, N. J.
Triangle (N.Y.)	Triangle Motor Truck Sales Co	381 4th Ave., New York
Union	Union Motor Truck Co	3d and Water Sts., Bay City, Mich
Velie	Velie Motors Corporation	Moline, Ill
Vim	Vim Motor Truck Co	Philadelphia, Pa
Walker	Walker Vehicle Co	531-45 W. 39th St., Chicago
Walter	Walter Motor Truck Co	New York City

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tor truck since the war. In case of labor difficulties on the common carriers, urban populations must depend upon motor transportation for the necessities of life. Analysis of the use of trucks in various industries shows that the majority are employed in carrying such essential commodities as food, clothing, coal, building material, steel and iron. According to statistics furnished by a leading truck maker coal dealers have invested over $7,000,000 in trucks; grocers $3,000,000; milk dealers and creameries, $1,500,000, and lumber men $4,000,000.

Motor transportation is economical as well as dependable. The greater rapidity with which the truck can operate its ability to supply twenty-four hour service, and elimination of the cost of several handlings by door-to-door delivery are factors that commend the use of motor trucks to managers of leading industries. Economy in distribution is passed on directly to the ultimate consumer in lower cost of living. The number of trucks in use has increased from 411 in 1904 to 435,000 at the present time. It is estimated that an average of 4,500,000 tons are hauled daily by motor trucks with a saving in transportation costs alone of $230,000,000.

Recognition of its importance as an industry and as a trustworthy carrier is being accorded to the motor truck by the Government and by individual consumers as well as producers and dealers in all commodities. The large attendance at the transportation conferences at the National Motor Truck Show, which may already be foreseen, will comprise a fair cross-section of modern society with all classes represented. Experts will discuss the subjects of good roads, motor express, trucking efficiency, and all the other ramifications of the motor transportation ideas. Sessions will be held each afternoon and evening, and are bound to be of interest to manufacturers of trucks, dealers and agents selling them, and consumers as well.

Conference on Highways at Show

Announcement has been made that the program is practically completed for the Highway Transport Conferences to be held in conjunction with the National Motor Truck Shows. The New York Motor Truck Show will be held the week of January 3-10 in the Eighth Coast Artillery Armory, 194th Street and Kingsbridge Road, and the Chicago show during the week of January 24-31 in the International Amphitheatre. Inaugural sessions of the conferences will take place on opening night at both shows, when the speakers will be men of national prominence and the general subjects of highways and motor transportation will be discussed with special reference to the economic aspects.

Afternoon and evening sessions will be held daily during the remaining six days of each show. Afternoon sessions are intended primarily for those engaged in the motor truck business, including manufacturing, distributing and service. Discussion will center upon such subjects as merchandising and advertising, legislation for highway improvement, sales plans, service, the motor transportation idea, and opportunities in rural sections.

Interests of motor truck owners and operators, shippers and the general public have been the primary consideration in arranging the evening program, for which the subjects scheduled are motor vehicles in passenger transportation; increasing motor haulage efficiency by such means as routing, loading and unloading devices, and incentives for drivers and helpers; such aids to efficiency as trailers and pneumatic tires; truck and railroad freighting; highways and motor transport; rural motor express as an investment and as an aid to producer and consumer.

Development of the rural motor express is proceeding rapidly as a result of the need to increase production and decrease cost of food. Perishable products may be brought to market in good condition and small farmers are combining in co-operative associations for using a single truck to haul food products to cities and bring back supplies on the return trip.

Better marketing and distribution to decrease cost of food by eliminating superfluous handlings of food products is a phase of the conference discussions which should prove especially interesting to the general public, although something of profit may be gained by a visit to any of the sessions of the very comprehensive program.

Brooklyn Auto Show in February

Announcement is made by the Brooklyn Motor Vehicle Dealers' Association that the Ninth Annual Brooklyn Automobile Show will be held in the Twenty-third Regiment Armory during the week of February 14 to 21. This announcement followed a meeting of the association held at the Long Island Automobile Club at which Clifford M. Bishop was elected president of the association. The other officers elected are Chester J. Maxson, vice-president; Fred Keugetter, second vice-president; I. C. Kirkham, treasurer, and W. A. Sellon, secretary.

For the first time in the history of the Brooklyn automobile show, both passenger cars and motor trucks will be exhibited on the floor of the armory during the same week. The passenger cars will be arranged in the center of the armory, while motor trucks will occupy the spaces on the sides of the interior.

Motor Truck Exhibitors—(Continued)

Ward (N.Y.)—Ward Motor Vehicle Co.	Mt. Vernon, N. Y.
Ward La France (N.Y.)—Ward La France Truck Co.	Elmira, N. Y.
Wilson—J. C. Wilson Co.	Detroit, Mich.
Winther—Winther Motor Truck Co.	Kenosha, Wis.

TRAILERS ON FLOOR WITH TRUCK EXHIBITS

Fruehauf (C)—Fruehauf Trailer Co.	Detroit, Mich.
Highway Trailer (N.Y.)—Hayes-Diefenderfer Co., Inc.	1872 Broadway, New York
Warner Trailer—Warner Mfg. Co.	Beloit, Wis.

BODIES ON MAIN FLOOR WITH TRUCK EXHIBITS

Metropolitan Body Co., Inc. (N.Y.)	430 Grand St., Bridgeport, Conn.
Parry Mfg. Co.	Indianapolis, Ind.

Rowe Motor Trucks at New York Show

The Rowe Motor Co., Lancaster, Pa., will have an excellent exhibit at the New York motor truck show in the Eighth Coast Artillery Armory. They can be found at Space M-2. The Rowe three-ton pneumatic tired truck will be one of the features of the show.

Trailers at the New York Show

The assignment of exhibition space at the New York truck show to several manufacturers of trailers is an innovation.

Building contractors, manufacturers and others are often confronted with the problem of moving big boilers, tanks, stationary engines, sections of steel chimneys, steel girders, heavy unit castings, stone building blocks or columns, and so forth, over streets and roads. Heretofore such jobs have been handled with horses and wagons, sometimes as many as ten or a dozen teams being used, at heavy expense and with much interference with other traffic, particularly in large cities.

With the development of motor trucking and the advent of trailers, new and improved methods have come into use. Many of the objects to be moved are too large or too heavy to be carried on trucks alone, although the trucks have ample power to haul them. By the use of trailers the weight is divided between the truck and trailer, and length is immaterial, as the trailer supports the rear end. Such an outfit will travel at a rate of six to ten miles an hour as compared with two to three miles with horses. It requires fewer men and is much cheaper.

Last May a refining company in Wyoming hauled a 30,000-pound steel still 12 feet in diameter by 35 feet in length a distance of 80 miles from Casper to Salt Creek, in that State in 19½ hours. The still was carried in a special cradle of heavy timbers, the front end of which was supported on the rear end of a 5-ton motor truck, while the rear end rested on a pair of two-wheel trailers coupled together. A part of the route lay over open country where there was no road and, as there were some steep hills, a 2-ton truck was used as a pusher on the grades. A short time before this a still of the same dimensions was hauled over the same route with horses, and it took 36 horses and ten men thirty days to do the job.

When one of the German U-boats was

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brought to New York last year to be exhibited in Central Park to help stir up enthusiasm for one of the Liberty loans, it was hauled to the park in three big sections with a motor truck and trailers. Each section was about 50 feet long and 18 feet high.

Heaviest Load on Rubber Tires

Probably the heaviest load ever hauled on rubber tires was a marine engine casting weighing 40 tons. This was transported last spring from Los Angeles to a shipbuilding drydock at San Pedro on the Pacific Coast. It was hauled on a specially-constructed two-wheel trailer of 100,000 pounds carrying capacity fitted with dual 40 by 12-inch solid rubber tires. The motive power was a 6½-ton truck, which carried a 7-ton steam engine to give ample traction. The distance of twenty miles was covered in 2¼ hours. This trailer has subsequently been used to transport rifle barrels for 16-inch coast defense guns being installed at Fort McArthur, near Los Angeles.

Another unusual haulage job was the transporting of a 65-foot steel derrick weighing 14 tons, with a motor truck and four-wheel trailer.

Logging trailers are used extensively with motor trucks for hauling huge logs to the sawmills. The U. S Spruce Production Corporation employed them in Oregon and Washington to get out spruce for aircraft production during the war. One of the biggest single logs hauled contained more than 3,800 board feet and weighed 20 tons.

It is not uncommon to haul 12 to 15-ton loads of piling 50 to 65 feet in length, with trucks and pole trailers, while the same method is used in hauling long, heavy structural steel beams and bridge girders.

This method of transportation has the advantage, in additon to speed and economy, that the weight is distributed over six or eight wheels and over a long wheelbase, and can be borne on rubber tires, thereby avoiding damage to improved roads and city streets.

Plenty of Room for All Trucks at the New York Show

For the first time it is possible to show complete lines of motor trucks without crowding The floor of the Eighth Coast Artillery Armory is 300 by 600 feet, unobstructed by posts, and the building is believed to be the largest of its kind in the world The roof, which is 110 feet high, is supported by sixteen steel girders, each of them 12 by 12 feet at the base and extending 160 feet under ground to bed rock Men in charge of the work of laying a new concrete floor in the armory in preparation for the truck show, ride from point to point in the room on bicycles, covering miles in the course of an ordinary day's work. To carry out the decorative ceiling scheme adopted by the show management will require bunting weighing eight and one-half tons.

Both of the buildings chosen to house the two divisions of the automobile show have the merit of accessibility Grand Central

Exhibitors of Accessories at National Shows

NAME	PASSENGER		TRUCK	
A. B. C. Mfg. Co., New York	N. Y.	Chi	.....	.....
Accurate System & Manifolding Co., New York	N. Y.	.....	.....	.....
Acme Auto Accessories Co., Chicago	.....	Chi	.....	.....
Advance Auto Accessories Corp., Chicago	N. Y.	Chi.	.....	.....
Air Device Co., Chicago	.....	Chi	.....	.....
Alemite Die Casting & Mfg. Co., Chicago	.....	Chi.	.....	.....
Alexander Mfg. Co., J., New York	N. Y	.....	.....	.....
Aluminum Brazing Solder Co., Philadelphia	.....	.....	N. Y	.....
Aluminum Castings Co., Cleveland, Ohio	N. Y	Chi.	N. Y	Chi.
American Auto Lamp Co., Inc., New York	N. Y	.....	.....	.....
American Auto Digest, Cincinnati, Ohio	N. Y.	Chi	N. Y	Chi
American Bosch Magneto Corp., Springfield, Mass.	N. Y.	Chi.	N. Y	Chi.
American Bureau of Engineering, Chicago	N. Y	.....	.....	.....
American Chain Co., Inc., Bridgeport, Conn	N. Y.	Chi.	N. Y	Chi.
American Ever Ready Works, Long Island City, N. Y.	N. Y.	Chi.	.....	.....
Amer. Hammered Piston Ring Co., Baltimore, Md	N. Y	Chi	.....	.....
American Machine Co., Newark, Del	.....	.....	N. Y.	Chi.
American Pump & Tank Co., New York	N. Y	.....	.....	.....
American Taximeter Co., New York	.....	.....	N. Y.	Chi.
Ames Co., F. A., Owensboro, Ky	N. Y	Chi.	.....	Chi.
Anderson Elec. Specialty Co., Chicago	N. Y.	.....	.....	.....
Apollo Magneto Corporation, Kingston, N. Y	.....	.....	N. Y	Chi.
Arco Mfg. Co., Inc., Chicago	.....	Chi	.....	.....
Arnold Electric Tool Co., New York	N. Y.	.....	.....	.....
Arrow Grip Mfg. Co., Glens Falls, N. Y.	N. Y.	Chi.	N. Y.	Chi.
Asch & Co., Inc., New York	N. Y.	.....	.....	.....
Au-To Compressor Co., Wilmington, Ohio	N. Y.	Chi.	.....	.....
Automatic Safety Tire Valve Corp., New York	N. Y.	.....	.....	.....
Auto Journal Publishing Co., Pawtucket, R. I	N. Y.	Chi.	N. Y	Chi.
Auto Pedal Pad Co., New York	N. Y	.....	.....	.....
Barnes Foundry Co., Jersey City, N. J	N. Y	.....	.....	.....
Barney's Auto Parts Co., New York	N. Y.	.....	.....	.....
Baush Machine Tool Co., Springfield, Mass	.....	.....	N. Y.	.....
Becker Brothers, Chicago	N. Y	Chi	.....	.....
Bendus, J. V., New York	.....	.....	N. Y	Chi.
Benjamin Electric Mfg. Co., Chicago	.....	Chi	.....	.....
Black & Decker Mfg. Co., Baltimore, Md	N. Y	Chi.	.....	.....
Blackledge Mfg. Co., John W., Chicago	N. Y.	Chi.	.....	.....
Breeze Mfg. Co., Newark, N. J	N. Y.	.....	.....	.....
Briscoe Devices Co., Jackson, Mich	N. Y.	Chi.	.....	.....
Brown-Lipe-Chapin Co., Syracuse, N. Y	N. Y.	.....	.....	.....
Brown-Lipe Gear Co., Syracuse, N. Y	N. Y.	Chi.	.....	.....
Buda Co., Harvey, Ill	.....	Chi.	N. Y	Chi.
Budd Mfg. Co., Edward G., Philadelphia	N. Y.	.....	.....	.....
Budd Wheel Corporation, Philadelphia, Pa	N. Y.	.....	.....	.....
Buell Mfg. Co., Chicago, Ill	.....	.....	.....	Chi.
Byrne, Kingston & Co., Kokomo, Ind	N. Y.	Chi.	N. Y	Chi.
Campbell Co., A. S., Boston, Mass	N. Y.	Chi.	.....	.....
Casco Mfg. Co., Thomasville, Ga	.....	Chi.	.....	.....
Challoner Co., Oshkosh, Wis	.....	.....	N. Y	Chi.
Champion Ignition Co., Flint, Mich	N. Y.	Chi.	.....	.....
Chase & Co., L. C., Boston, Mass	N. Y.	Chi.	.....	.....
Chicago Steel Wheel Co., Chicago, Ill	N. Y.	Chi.	.....	.....
Chilton Company, Philadelphia, Pa	N. Y.	Chi.	N. Y.	Chi.
Clark Equipment Co., Buchanan, Mich	.....	.....	N. Y.	Chi.
Class Journal Co., New York City	N. Y.	Chi.	N. Y.	Chi
Cleveland Heater Co., Cleveland, Ohio	N. Y	.....	.....	Chi.
Coffield Tire Protector Co., Dayton, Ohio	N. Y.	.....	.....	.....
Columbia Axle Co., Cleveland, Ohio	.....	Chi.	.....	.....
Commercial Investment Trust, New York	.....	.....	N. Y.	.....
Connecticut Clock Co., New York	N. Y	.....	.....	.....
Continental Motors Corporation, Detroit, Mich	N. Y.	Chi.	N. Y.	Chi.
Copp Co., George W., New York	N. Y.	.....	.....	.....
Corbin Screw Corp., New Britain, Conn (American Hardware Corp., Successors)	N. Y.	Chi.	.....	.....
Corcoran Mfg. Co., Cincinnati, Ohio	.....	Chi	.....	.....
Corcoran-Victor Co., Cincinnati, Ohio	N. Y.	.....	.....	.....
Cowles & Co., C., New Haven, Conn	N. Y.	Chi.	.....	.....
Cramp & Sons Ship & Eng. Co., W., Philadelphia	N. Y.	Chi	.....	.....
Cronk, E. D. & A. F., Inc., Utica, N. Y	N. Y	Chi	.....	.....
Curtis Pneumatic Mach. Co., St. Louis, Mo	N. Y.	Chi.	.....	.....
Dayton Steel Foundry Co., Dayton, Ohio	.....	.....	N. Y	Chi.
Defender Auto Lock Co., Inc., Detroit, Mich	.....	Chi.	.....	.....
Detroit Carrier & Mfg. Co., Detroit, Mich	.....	Chi	.....	.....
Detroit Pressed Steel Co., Detroit, Mich	N. Y.	Chi.	.....	.....
Dewey, George W., New York City	N. Y.	.....	.....	.....
Dixon Crucible Co., Jos., Jersey City, N. J	N. Y	Chi.	N. Y	Chi.
Doehler Die-Casting Co., Brooklyn, N. Y	N. Y	Chi.	.....	.....
Dorr Miller Differential Co., New York	N. Y.	Chi.	.....	.....
Duff Mfg. Co., Pittsburgh, Pa	N. Y.	Chi	.....	.....
Dunham, Thomas Co., Aurora, Ill	N. Y.	Chi.	.....	.....
Duplex Engine Governor Co., Inc., Brooklyn, N. Y	.....	.....	N. Y	Chi
Detroit Steering Wheel Corporation, Detroit, Mich	N. Y	Chi	.....	.....

(Continued on next page)

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Palace at 40th Street and Lexington Avenue, where the passenger cars will be exhibited, is well known as an exposition hall. Although Eighth Coast Artillery Armory has never before been used for a public display it is particularly well adapted to this purpose because of its size and because it is conveniently located near subway and elevated. Either Lexington Avenue or 7th Avenue subway and either 6th or 9th Avenue elevated reaches the armory.

LaFayette Car Makes Its Debut

Motordom will have its first opportunity to inspect the new LaFayette car during the week of the New York automobile show, January 3 to 10. The latest creation of D. McCall White, designer of the English Daimler and Napier, and of the eight-cylinder Cadillac, will be exhibited in the main lobby of the Hotel Commodore, instead of at the Grand Central Palace, where Father Knickerbocker stages his 1920 motor revue.

The apparent exclusiveness of the LaFayette is due to the wise and just practice of the National Automobile Chamber of Commerce, which bars the doors of the New York and Chicago shows to any car that has not been in production for at least one year. This edict makes imperative a private showing of the LaFayette, which, six months ago, was only in the blue print stage of development, but which has been translated into metal for test and improvement during the intervening months.

The car to be placed on view will be an experimental, hand-built chassis, fitted with a sedan body.

Machinery is now being installed in the new LaFayette plant at Indianapolis, and the start is being speedily set for production early next summer. The destinies of the Lafayette Motors Company will receive direct guidance from D. McCall White and E. C. Howard, vice-presidents, who are now permanently located in Indianapolis. Charles W. Nash, president of the company, serves in an advisory capacity, his interests at Kenosha, Wis., where he heads the Nash Motors Company, precluding a more active participation in the affairs of the Indianapolis concern.

Because of the distance between the Grand Central Palace, New York, where the Twentieth Annual Automobile Show is to be held January 3 to 10, and the Eighth Coast Artillery Armory, which is to house the Motor Truck Show, motor bus passenger lines will be operated between the two points for the convenience of visitors. The distance is one that will make a pleasant ride and will provide a sight-seeing trip for many who would not otherwise have the opportunity if other means of transportation were used. The Cutting-Larsen Company, distributors of Goodyear pneumatic-equipped Oldsmobile passenger busses, will operate a bus line with adequate service. Other companies have indicated their intention of running bus lines between the two shows, but have not made final arrangements.

Exhibitors of Accessories at National Shows

(Continued from page 13)

NAME	PASSENGER		TRUCK	
E. A. Laboratories, Inc., Brooklyn, N. Y.	N. Y.	Chi.	.....	.....
Eastern Machine Co., So. Easton, Mass.	.....	.....	N. Y.	Chi.
Eastern Rubber Co., Philadelphia, Pa.	N. Y.	Chi.	.....	.....
Eclipse Machine Co., Elmira, N. Y.	N. Y.	Chi.	.....	.....
Edelman & Co., E., Chicago, Ill.	.....	Chi.	.....	.....
Eisemann Magneto Co., Brooklyn, N. Y.	N. Y.	Chi.	N. Y.	Chi.
Electric Storage Battery Co., Philadelphia	N. Y.	Chi.	.....	.....
Empire Axle Co., Dunkirk, N. Y.	.....	.....	N. Y.	Chi.
English & Mersick Co., New Haven, Conn.	N. Y.	.....	.....	.....
Ericsson Mfg. Co., Buffalo, N. Y.	N. Y.	.....	.....	Chi.
Essenkay Products Co., Chicago, Ill.	N. Y.	Chi.	.....	.....
Essex Rubber Co., Inc., Trenton, N. J.	N. Y.	.....	.....	.....
Everyday Engineering Magazine, New York	N. Y.	Chi.	.....	.....
Fairbanks Company, New York	N. Y.	Chi.	.....	.....
Faw, J. H., Inc., New York	N. Y.	.....	.....	.....
Fire-Gun Mfg. Co., Inc., New York	N. Y.	Chi.	.....	.....
Fleckenstein Visible Gasometer, Grand Rapids	N. Y.	Chi.	.....	.....
Flint Motor Axle Co., Flint, Mich.	.....	.....	N. Y.	Chi.
Ford News Publishing Co., Long Island City	N. Y.	Chi.	.....	.....
Franklin Mach. & Tool Co., Springfield, Mass.	.....	.....	N. Y.	Chi.
Fulton Co., Knoxville, Tenn.	N. Y.	Chi.	.....	.....
Gabriel Mfg. Co., Cleveland, Ohio	N. Y.	Chi.	.....	.....
Gastine Co., Bridgeton, N. J.	N. Y.	.....	.....	.....
General Electric Co., Schenectady, N. Y.	N. Y.	Chi.	.....	.....
Gill Mfg. Co., Chicago, Ill.	N. Y.	Chi.	.....	.....
Globe Mfg. Co., Battle Creek, Mich.	N. Y.	Chi.	.....	.....
Gould Storage Battery Co., New York	N. Y.	Chi.	.....	.....
Gray & Davis, Inc., Boston, Mass.	N. Y.	Chi.	N. Y.	Chi.
Grundy Mfg. Corporation, Detroit, Mich.	.....	Chi.	.....	.....
Guarantee Visible Measure Sales Co., Washington, D. C.	N. Y.	.....	.....	.....
Hale & Kilburn Co., Philadelphia	N. Y.	Chi.	.....	.....
Halladay Co., J. P., Streator, Ill.	.....	Chi.	.....	.....
Hart-Bell Co., Inc., New York	N. Y.	Chi.	.....	.....
Hartford, Edw. V., Inc., New York	N. Y.	Chi.	.....	.....
Harvey Wheel Sales Co., New York	N. Y.	Chi.	.....	.....
Hassler, Robert H., Indianapolis, Ind.	.....	Chi.	N. Y.	.....
Haves Wheel Co., Jackson, Mich.	N. Y.	Chi.	.....	.....
Heinze Electric Co., Lowell, Mass.	N. Y.	Chi.	.....	.....
Hercules Motor Mfg. Co., Canton, Ohio	.....	.....	N. Y.	Chi.
Hero Mfg. Co., Philadelphia	.....	.....	N. Y.	Chi.
Hill-Smith Metal Goods, Boston, Mass.	N. Y.	Chi.	.....	.....
Holmes, George L., New York City	N. Y.	.....	.....	.....
Holophane Glass Co., Inc., New York	N. Y.	.....	.....	.....
Hompert Machine Co., Long Island City, N. Y.	N. Y.	.....	N. Y.	.....
Hoyt Electric Instrument Co., Penacook, N. H.	N. Y.	.....	.....	.....
Hudson Motor Specialties Co., Philadelphia	N. Y.	Chi.	N. Y.	Chi.
Hunal Corporation, New York	.....	.....	.....	Chi.
Imperial Brass Mfg. Co., Chicago, Ill.	.....	Chi.	.....	.....
Improved Gauge Mfg. Co., Syracuse, N. Y.	N. Y.	Chi.	.....	.....
Inland Machine Works, St. Louis, Mo.	N. Y.	Chi.	.....	.....
International Magazine Co., New York City	N. Y.	Chi.	.....	.....
Iron City Products Co., Pittsburgh, Pa.	N. Y.	Chi.	.....	Chi.
Jaxon Steel Products Co., Jackson, Mich.	.....	.....	N. Y.	Chi.
Jiffy Jack Co., Cleveland, Ohio	N. Y.	Chi.	.....	.....
Johnson Auto Lock Co., Chicago, Ill.	N. Y.	Chi.	.....	.....
Johnston Mfg. Co., Wm. R., Chicago, Ill.	N. Y.	Chi.	.....	.....
K-W Ignition Co., Cleveland, Ohio	N. Y.	Chi.	.....	.....
Kales Stamping Co., Detroit, Mich.	N. Y.	Chi.	.....	.....
Kellog Mfg. Co., Rochester, N. Y.	N. Y.	.....	.....	.....
Kent Mfg. Co., Atwater, Philadelphia	N. Y.	Chi.	.....	.....
Keystone Rubber Mfg. Co., Erie, Pa.	N. Y.	.....	.....	.....
Klaxon Co., Newark, N. J.	N. Y.	Chi.	.....	.....
Laidlaw Co., Inc., New York City	N. Y.	.....	.....	.....
La-Lo Chemical Co., Providence, R. I.	N. Y.	.....	.....	.....
Lane Brothers Co., Poughkeepsie, N. Y.	N. Y.	Chi.	.....	.....
Lanraine Magneto Co., New York City	.....	.....	N. Y.	Chi.
La Vietes, Inc., Geo. F., New York City	N. Y.	.....	.....	.....
Lawrence & Co., L., New York City	N. Y.	Chi.	.....	.....
Lee Mercantile Co., H. D., Kansas City, Mo.	N. Y.	.....	.....	.....
Le Compte Co., Newark, N. J.	.....	Chi.	.....	.....
Lewis Searing Co., Flint, Mich.	N. Y.	Chi.	.....	.....
Light Mfg. & Foundry Co., Pottstown, Pa.	N. Y.	.....	.....	.....
Lightning Change Rim Corporation, Chicago	.....	Chi.	.....	.....
Lipman Refrigerator Car & Mfg. Co., Beloit, Wis.	N. Y.	Chi.	.....	.....
Lobes Body Co., Inc., Mt. Vernon, N. Y.	.....	.....	N. Y.	.....
Longdin Brugger Co., Fond du Lac, Wis.	N. Y.	.....	.....	.....
Loomis Lauritson Co., New York City	N. Y.	Chi.	.....	.....

(Continued on page 45)

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Rowe
THE PIONEER WORM-DRIVE TRUCK



Greetings, Friends

and best wishes for a very Happy and Prosperous New Year

1920 finds us well equipped for rendering prompt service and in position to offer Rowe agencies for some very choice territory.

There are reasons—and good ones—for handling Rowe Trucks taken up in this advertisement. See next page—read and reflect.

Meet us at the New York Truck Show, January 3 to 10. Space M-2, Eighth Coast Artillery Armory, 194th St. and Jerome Ave. Take Lexington Ave. Subway or Elevated Trains on Sixth or Ninth Ave.

ROWE MOTOR CO., Lancaster, Pa.

ROWE MOTOR COMPANY — ROWE RUNS RIGHT — LANCASTER, PA.

ROWE MOTOR COMPANY — ROWE RUNS RIGHT — LANCASTER, PA.

Mention THE VEHICLE MONTHLY when writing to advertisers

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Rowe Rowe

It's A Wise Move

TO SECURE AN AGENCY FOR ROWE MOTOR TRUCKS

1. Because they always run right.
2. Because they appeal to all classes of truck users, offering a choice of 5 models—2, 2½, 3, 3½ and 5-ton capacities.



ROWE TWO TON, MODEL C. D. W.

A truck that is [illegible] This model is a splendid [illegible] 10 feet 3 inches; [illegible]

3. Because they are economical in operation and upkeep, therefore making friends with users' friends and bringing more business to the dealer.
4. Because the Rowe units are nationally known as the best on the market, for example—Wisconsin engine, Sheldon springs and axles, Ross steering gear, Brown-Lipe transmission, Bosch magneto, Zenith carburetor.

Write for complete description

ROWE MOTOR CO., Lancaster, Pa.,

ROWE MOTOR COMPANY ROWE RUNS RIGHT LANCASTER, PA

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Rowe



ROWE Trucks

Are Wonders for Speed and Endurance

The model here shown--our 3-ton pneumatic--will travel 30 miles per hour and stand up to the work day in and day out without a sign of weakening.

That's because it was designed purposely for such work—a regular truck equipped with pneumatic tires would simply shake to pieces.



Rowe trucks are always reliable. Send for catalog and become acquainted with their many strong talking points

ROWE MOTOR CO., Lancaster, Pa.

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Rowe
THE PIONEER WORM-DRIVE TRUCK

LOADS LIMITED ONLY BY HEIGHT OF BRIDGES:—That's how the men in this photograph express the carrying capacity of Rowe Motor Trucks.



There's a Rowe for every line of business, and there's an attractive agency proposition for you.

Write us for full particulars and large catalog

ROWE MOTOR CO., Lancaster, Pa.

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

No. XII—CLUTCH AND BRAKE REPAIR AND ADJUSTMENT

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

Fundamentally there is little difference between a clutch and a brake. The former puts a brake on the engine, and as a result the car moves; the latter puts a brake on the wheels, and as a result, the car stops. As stopping and starting are two most important items of motor car operation, the necessity of intelligent maintenance, operation and repair of these units is indicated.

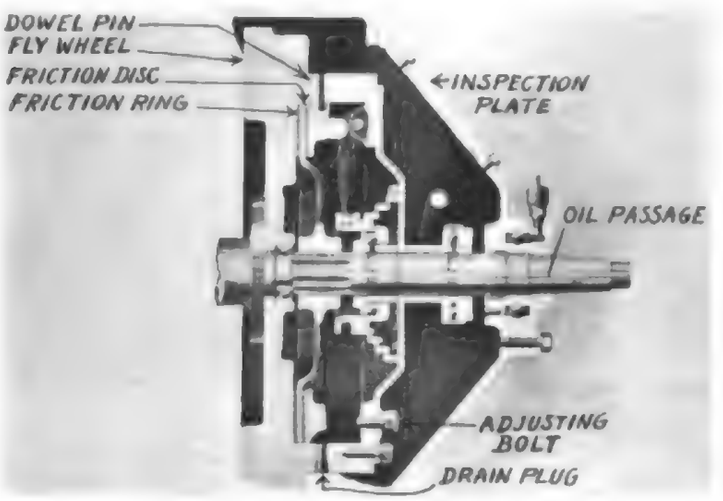


Fig. 1. Borg & Beck single plate dry disc clutch.

General Types of Clutches

There are three general types of clutches: the cone clutch, the plate clutch, and the multiple disc clutch. These are illustrated in Figs. 1 to 3 inclusive.

The Borg & Beck clutch, Fig. 1, is of single plate, dry disc construction. It will be noted that it consists of a disc, attached to the drive shaft of the vehicle, and sandwiched between two asbestos rings. The flywheel face is at one side, and a thrust ring at the other, the latter being fastened to, and rotating with the flywheel. Normally the thrust ring is pressed tightly against the friction rings and friction disc by a spring, locking the whole, so that it rotates with the flywheel and turns the drive shaft. However, pressure on the clutch pedal draws the thrust ring away from the friction rings and disc, so that the latter is no longer driven by the flywheel.

Clutch Adjustment

Through continued service, wear will occur in the friction rings. This condition is indicated by a slipping clutch, and a certain amount of wear may be compensated for by a simple adjustment. Following are the steps in making this adjustment:

1—Remove the inspection plate at the top of the clutch housing.

2—Crank the engine by hand until one of the adjusting bolts, Fig. 1, comes to view. Loosen this bolt. Continue the cranking until the other adjusting bolt comes to view, and loosen it likewise.

3—Tap this bolt, so that it swings a slight amount in its slot *in a clockwise direction*. This tightens the clutch. Then tighten both adjusting bolts. (To loosen clutch, tap in opposite direction.)

The amount that these bolts must be moved depends upon the amount of wear in the friction rings, and the adjustment should be checked by trial. If the adjustment has been taken up so far that the bolts are at the right-hand end of the slots, "repeat holes" will be found at the left end, and the bolts may be inserted there and the adjustment continued.

However, a point may be reached where such adjustment will not produce satisfactory clutch operation, and it may then be necessary to take the clutch down and insert new friction rings. It may be that oil has leaked into the clutch from the engine, and this possibility should be investigated. If so, the leak should be stopped, and the friction

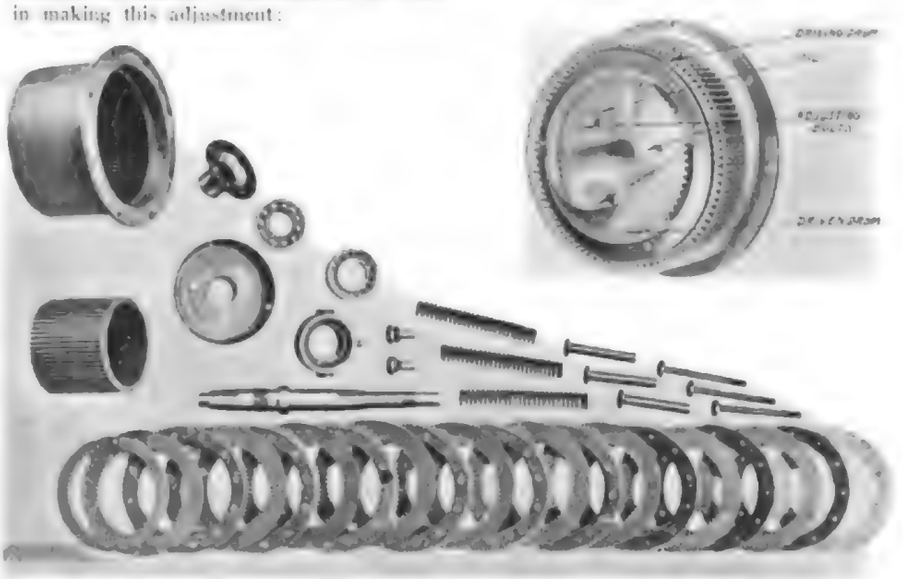


Fig. 2. Upper—The Detloff multiple disc clutch assembled. It is adjusted through the bolts. Lower—The Detloff multiple disc clutch disassembled.

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rings washed with gasoline. In taking down the clutch the various ball bearings should be examined and cleaned. The new rings may be obtained from the car manufacturer.

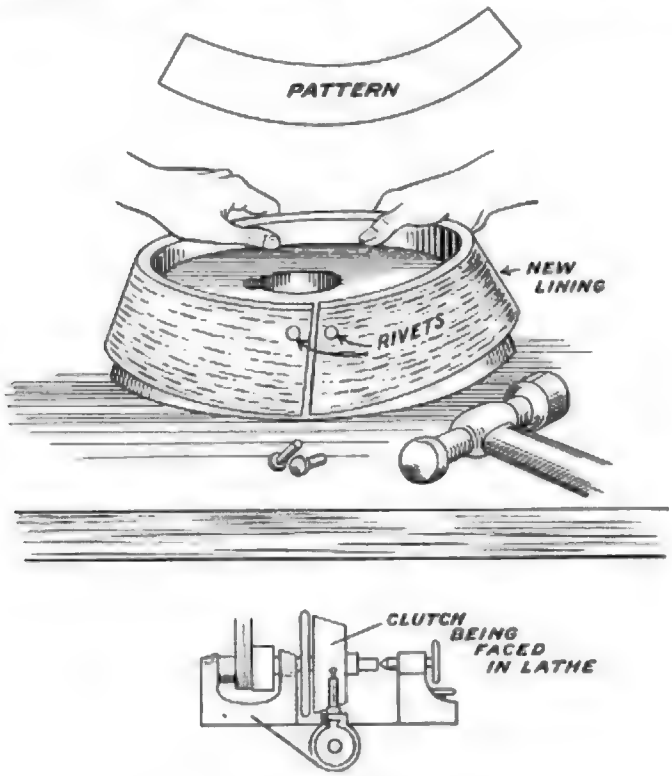


Fig. 3 Method of lining a cone clutch.

Multiple Disc Clutches

In Fig. 2 is shown a Detloff multiple disc clutch. This consists of two drums, the outer bolted to the flywheel and having teeth on its inner surface; the inner attached to the drive shaft, and having teeth on its outer surface. Two *sets* of asbestos faced discs *alternate* between the two; the *former* having teeth engaging the *inside* drum, and the *latter* teeth engaging the *outside* drum. Springs force these discs together, and the resulting friction permits the torque of the engine to be transmitted through them to the drive shaft. Pressure on the clutch pedal causes the springs to contract; the discs to separate, and breaks the connection between the engine and the drive shaft.

A slipping clutch of this type may be corrected by tightening the adjusting bolts shown in Fig. 2. A total take-up of about 5/8 inch is possible on these bolts, and after that point the clutch should be taken down, and the discs refaced.

The facings are asbestos fabric riveted to the driving plates with tubular brass rivets. These linings may be purchased separately from the car manufacturer and riveted on in the same manner as is subsequently described for brake linings, using hollow rivets, countersunk.

Cone Clutches

The maintenance and repair of the common leather-faced cone clutch is so familiar to the average motor car mechanic as to merit little description here. The necessity of keeping the face of the clutch free from mineral oils, and occasional treatment with neatsfoot oil covers maintenance in general. On certain clutches of this type, springs are provided beneath the surface of the lining, that permits a certain amount of adjustment. It may be stated that when a clutch of this kind is once glazed and burned by continued slipping, relining is necessary.

In Fig. 3 the method of applying the lining on a clutch of this type is illustrated. The new lining may be cut from leather, using the old lining as a pattern; or it may be purchased from the car manufacturers. (Or possibly a special lining may be used.) Soak the leather well in water. The two ends of the new lining are riveted in place, as illustrated, and the lining forced down in place on the cone. The next step is to punch the rivet holes from the inside, and to countersink the holes for the rivets.

In carrying on this work the tools shown in Fig. 4 and the methods shown in Fig. 5 are in general applicable. Care must be taken to have the leather fit tightly against the cone over the entire surface, and to have the rivet heads set well into the surface of the leather. Allow the leather to dry out slowly.

After the leather is applied in this manner, the assembly should be chucked in a lathe, and a light surfacing cut taken to dress down the surface of the leather to a uniform thickness. Then sandpaper the face slightly and soak with neatsfoot oil.

Tools Required in Brake and Clutch Lining

The tools illustrated in Fig. 4 are those recommended by the Raybestos Company for relining clutches and brakes. They may be purchased from this company, or can be made up by the mechanic in spare time.

Tool (A) is a countersink for rivet heads, and two are required. One has a marked bevel on the cutting edges, and is used to countersink for solid rivet heads. The other has cutting edges with but a slight bevel, and

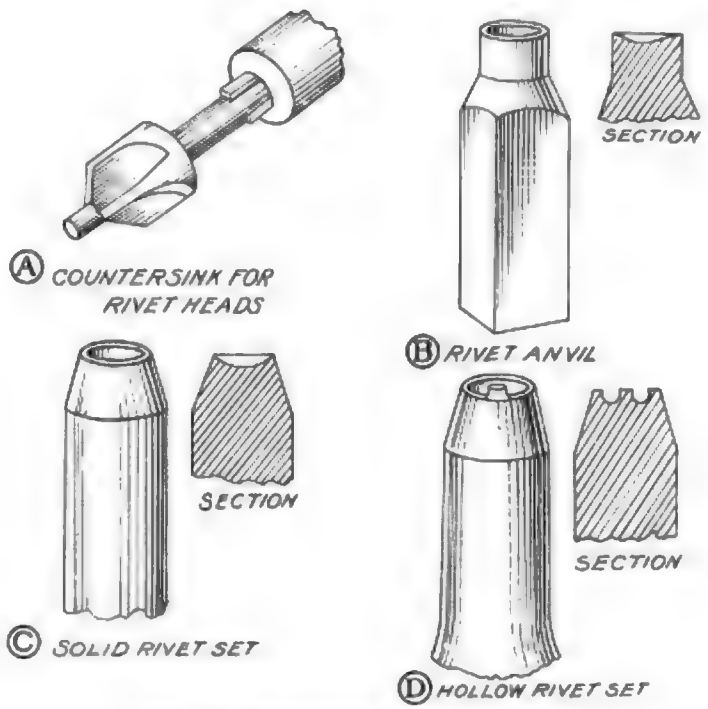


Fig. 4. Tools for re-lining clutches and brakes.

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is used for countersinking for tubular rivets. The countersinks may be made from cold rolled steel, with the cutting edge case hardened in cyanide.

Tool (B) is a rivet anvil. It is caught in a vise as shown in Step 5, Fig. 5, and the head of the rivet is set against it when heading the rivet in place. It likewise may be cold rolled steed, case hardened, though tool steel, hardened, would be better.

Tool (C) is a set for solid rivets. It is similar to a punch, with the point slightly concave, and hardened. It is used to head over the solid rivets, as shown in Step 5, Fig. 5.

Tool (D) is a hollow rivet set. It is similar to Tool (C), except that it has a small circular projection in the center of the head that is inserted into the hollow rivet, and caused it to spread outward under a hammer blow. It is used as shown in Step 5, Fig. 5.

Re-lining Contracting Brakes

If the brake bands are worn, or frayed, re-lining is necesary. After removal from the car and removal of the old lining, the bands should be examined to see that they are not badly sprung from the round. If so, they should be formed back to shape.

The new lining should be cut to about 3/8 inch *longer* than the brake band, and riveted in place at both ends, with solid rivets, as shown in Step 1, Fig. 5. It is to be noted that an excess amount of lining is used, so that it bulges up in the center. This is done

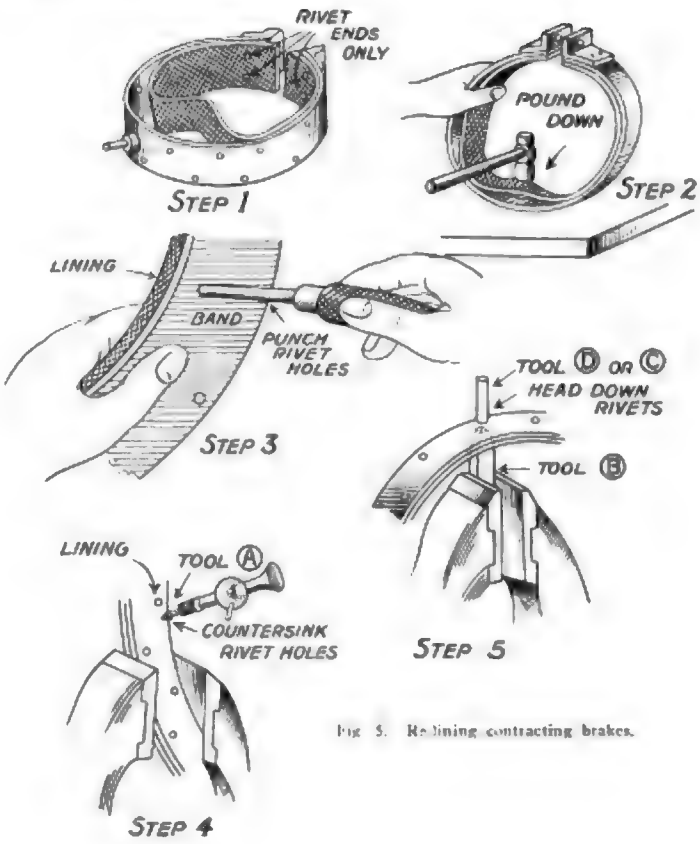


Fig. 5. Re-lining contracting brakes.

with a purpose. Occasionally the mechanic will apply the band by riveting one end and following around the band with the rivets to the other end. The tendency is in this case to make the band too short, so that it extends directly from rivet to rivet, and does not conform to the steel band. With a band applied in this manner, it is difficult to make a satisfactory brake adjustment; the band is distorted, and the rivets pulled from the lining.

The next step is to force the lining down into the band. As it is longer, it will crowd slightly, and hug the band all the way around. The rivet holes may then be punched through the band into the lining with a hand punch as shown in Step 3, Fig. 5. The next step is to place the hollow rivet head countersink in a hand drill, and countersink the rivet head holes in the lining. The countersink holes should let the rivet head set at least 1-3 the way through the lining.

Hollow rivets are then inserted through these holes, with the heads on the inside. Tool (B) is caught in a vise, and the heads in turn rested on it, and the opposite ends headed over by the aid of Tool (D).

The band is then ready for replacement on the car, and should be so adjusted that there is about 1/32 inch clearance between it and the drum all of the way around, when the brakes are released. This will remove any possibility of dragging brakes.

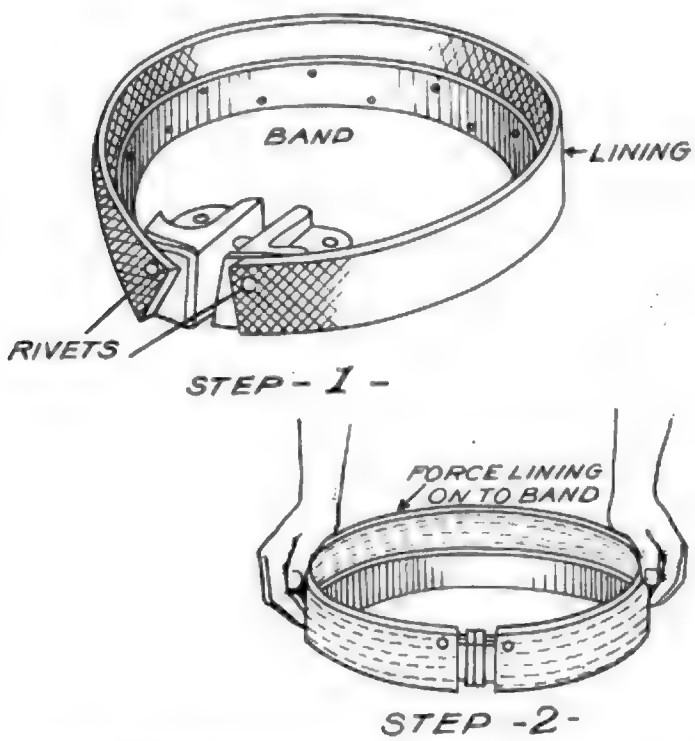


Fig. 6. Method of re-lining expanding brakes. The remainder of the steps are the same as in the case of contracting brakes.

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Re-lining Expanding Brakes

The method just described for re-lining contracting brakes applies in general to expanding brakes. However, there is one important difference. In this case the linings should be cut ½ inch *shorter* than the bands. This permits them to be stretched tightly on the band, with no possibility of slack in service.

The first step is to rivet the two ends of the lining to the band by two solid rivets, one at each end, as shown in Fig. 6, Step 1. The entire assembly is then placed flat on the bench, and the lining forced over the band in the manner illustrated in Fig. 6, Step 2.

The remaining steps have been described, namely, Steps 3, 4 and 5, of Fig. 5. Here, too, hollow rivets are used throughout, with the single exception of the end rivets.

In adjusting internal brakes a clearance of ⅛ inch between the lining and the drum is also necessary, when the brake is off. As this cannot be measured with the wheel in place, many motor car mechanics make up "dummy" drums to measure this setting.

The "dummy" drum is simply the brake drum from the same make of car as is being worked upon, and having the face of the drum cut away so that the relation of the internal brake and the drum can be noted. The use of such a drum facilitates brake adjustment work.

It is to be noted that the above described methods and tools can be applied to re-lining planetary clutch bands (Ford type), and to re-lining clutches.

The proper condition of brakes may be determined by a simple road test, after setting up as shown above. When in good condition, normal application of the brakes should stop the car, without slipping the wheels, in one car length at 10 miles per hour; in 5 car lengths at 25 miles per hour, and 12 car lengths at 40 miles per hour.

S. A. E. Has Important Show Week Program

As usual, one of the big features of Automobile Show week in New York is the annual meeting of the Society of Automotive Engineers. This meeting, while serving automotive engineers much as a barometer for the ensuing year, provides an opportunity for the executive and engineer to meet and discuss problems of mutual concern, which ultimately benefits the person buying a car a season or two hence. In addition to the professional sessions this season, a "Carnival Night" and the annual dinner at Hotel Astor also are scheduled for January 7th and 8th respectively. A record attendance of members from all over the country is expected.

At the general session Wednesday morning, January 7, reports of the various business committees will be discussed and at ten o'clock a symposium on "Needs and Tendencies of Engine Design" will include papers to be read by F. H. Trego and L. H. Pomeroy. Luncheon will be served at one o'clock, and in the afternoon E. G. Gunn, an engineer who has had extensive experience with aluminum pistons, will speak on this subject.

Mr. Brewster Will Read Paper on "Automobile Body Design"

"Automobile Body Design," by Mr. Brewster, will dwell on the results of the many years of custom body designing and manufacturing. It is believed that this will result in bringing out many new facts bearing upon body building adaptable for the seasons immediately ahead.

Spring Suspension Will Be Studied

Other papers to be read are "The Measurement of Vehicle Vibrations," by Benjamin Liebowitz; "Spring Suspension," by E. Favary, and an especially interesting paper by L. L. Scott on "Automotive Steam Systems." The opportunity will be offered for discussion that will bring out many new ideas relating to devices for the regulation of steam in motor cars.

Thursday, at the Fuel Research Session, J. G. Vincent will speak on "Adapting Engines to Use of Available Fuels;" P. S. Tice, Thos. Midgley, Jr., and S. W. Sparrow will read papers on "High Speed Indicators." A paper on "Lubrication Research" will be read by G. A. Kramer. A symposium on "Combustion of Hydrocarbon Fuels" will be participated in by Dr. H. C. Dickinson, C. F. Kettering, H. L. Horning, Donald McKenzie and H. Honoman.

"Mixed Fuels" is Dr. R. M. Strong's subject. "A Standard of Carburetor Performance" will be talked about by O. C. Perry, Professor of Gasoline and Automotive Engineering, Purdue University. "Supercharging Engines and Superchargers," by Major G. E. A. Hallett, is an interesting description which contains figures showing to what extent under decreased barometric pressure the maintenance of engine power can be counted upon when the supercharger is used on aeroplanes at high altitude. H. C. Gibson will present some suggestions on "Bettering the Efficiency of Existing Engines."

Carnival night is to be a gay, hilarious affair, at Hotel Astor, Wednesday evening, January 7, 9 o'clock, and Thursday evening, the usual dinner at the same place, with John Kendrick Bangs, toastmaster.

Another very important field covered by the S. A. E. is research work. The great question of fuel shortage is of paramount importance to the entire world. Experiments are being conducted to find out how lower grades of fuel can be efficiently utilized. Existing automobile engines are designed to use fuel of relatively high quality, but the gasoline now available is becoming less and less volatile. This increases the difficulty of utilizing the fuel efficiently in the motor. The solution of the problem seems to be in adapting the engine to use this fuel, but efforts are being made to improve the quality. There is a great waste of gasoline every year. People drive with poorly adjusted carburetors, using a rich mixture, and they also keep the engine running unnecessarily. The fuel problem is of international importance, and the Society is doing its utmost to assist in bringing about a solution.

These and other engineering problems are the subjects of discussion at frequent meetings of the Society. The annual meeting is held in New York every year, during the week of the automobile show. This year's meeting takes place January 6-8, and another meeting of the Society will be held in Chicago, January 28, during the Chicago Show week. Sectional meetings are held from time to time in Minneapolis, Detroit, New York, Chicago, Buffalo, Philadelphia, Cleveland and Indianapolis. Subjects pertaining to automotive engineering are discussed, with great profit to both the engineers and the manufacturers they represent, as well as to the motoring public.

The officers of the Society are: Charles M. Manly, president; B. B. Bachman, first vice-president; E. H. Belden, second vice-president; Elmer A. Sperry, second vice-president; E. B. Funk, second vice-president; John J. Amory, second vice-president; L. S Keilholtz, second vice-president; C. B. Whittelsey, treasurer; S. F. Kettering, past president; Cocker F. Clarkson, secretary and general manager.

Some S. A. E. History

Back in the year 1904 a small group of enterprising men banded together to form the Society of Automobile Engineers, now called the Society of Automotive Engineers That same society has expanded until now its membership is about 4,500. At the outset its work was largely confined to the automobile industry, but with the rapid advance of automobile engineering, it was found necessary to extend the field. In 1917 the name was changed to the Society of Automotive Engineers to indicate the inclusion of not only the automobile, but the tractor, motor boat, stationary engine, aeronautics and other engineering fields.

Among the most important benefits derived from the work of the Society by the automotive industries has been the standardizing of parts used in automotive vehicle construction. This work does not interfere in any way with the individuality of design. The result has been to reduce the cost of manufacture, enable increased production, and the carrying of small stocks by the dealer. Car owners would find their repairing a difficult and lengthy procedure if there were no standard sizes. Take the example of spark plugs. if every car had a different size thread for its plug, it would be impossible for the repairmen to keep a supply in stock. If a plug broke, the car owner would be fortunate to obtain the desired size, without going to the factory. With one standard it is a simple matter to install a new plug out of the stock carried by the repair shop.

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"Vehicle Monthly" Time Savers

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

"Vehicle Monthly" Time Saver No. 56
TIRE SUPPORT HOOK

In retreading work, and occasionally in regular vulcanizing work, it is necessary to cover the entire outside of the casing with cement. In applying the cement, and in the subsequent drying, the work is expedited through the use of tire support hooks. These hooks are steel rods, bent roughly to the form of a letter "S," one end being supported on a steel pipe, and the other carrying the casing, supporting it from the inside. By this arrangement, the casings may be cemented at the bench, and slid down the pipe out of the way to dry.—H. F. Blanchard, Greene Tire Co., Philadelphia.

"Vehicle Monthly" Time Saver No. 57
TIRE BUFFING EQUIPMENT

The preparation of a casing for vulcanizing is facilitated if a buffing wheel be used to remove the damaged rubber from the tread. In addition the action of the buffing wheel roughens up the surface of the rubber, cleans it, and provides the best possible surface for cementing and repair. In connection with the buffing wheel, the device illustrated will be found valuable. It consists of two rollers carried in an L-frame and supported from the ceiling by means of a spring and strap, adjacent to the buffing wheel. The casing to be buffed is supported on the rollers, and may be held against the buffing wheel with little effort.—Greene Tire Co., Philadelphia.

"Vehicle Monthly" Time Saver No. 58
TIRE SIDEWALL KNIFE

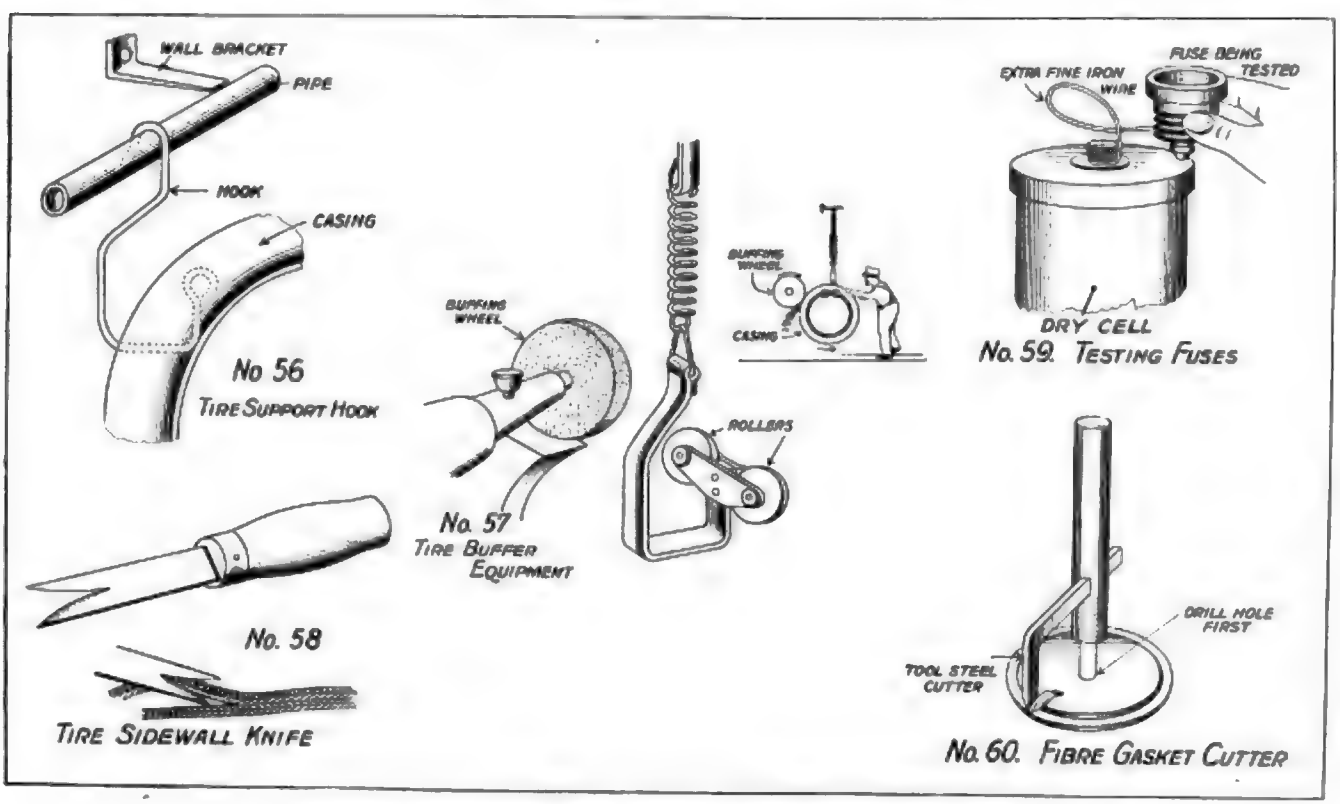
In effecting casing repair it is often necessary to "step down" the various layers of fabric, in order to get a good base for the new material. The special knife shown helps in this work. It is simply the ordinary fabric knife, squared off at the end, and then "fish-tailed," the cutting edges being in the V. By inserting one of the points through the layers of fabric it is desired to cut, the layers may be slashed out with little effort.—Greene Tire Co., Philadelphia.

"Vehicle Monthly" Time Saver No. 59
TESTING FUSES

Due to overloading, etc., the fuses at the shop power lines occasionally blow out, and work must be suspended until a new fuse can be replaced. It is not always an easy matter to determine exactly which fuse has blown, and often five or ten minutes may be wasted in trying various combinations to find out. An ordinary dry cell and about six inches of extra fine soft iron wire may be used to test the fuses in turn and determine whether they are defective. Sketch 59 shows the method. If the wire becomes warm, the fuse is O. K., if not, it is defective.—Greene Tire Co., Philadelphia.

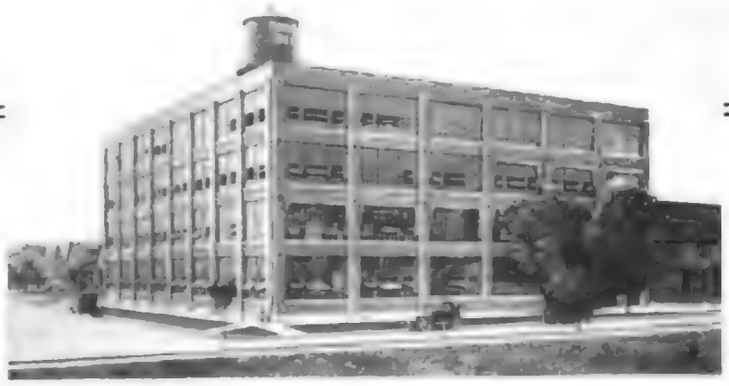
"Vehicle Monthly" Time Saver No. 60
FIBRE GASKET CUTTER

In electrical repairs it is sometimes necessary to make up gaskets from heavy sheet fibre, and these may be cut in a drill press, with but little waste in time or material, by means of a special cutter. This cutter is adjustable and may be used in cutting holes in the dash for instruments.—J. Slack, Philadelphia.



"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ABOVE

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View of plant where Ternstedt Closed Body Hardware is built.

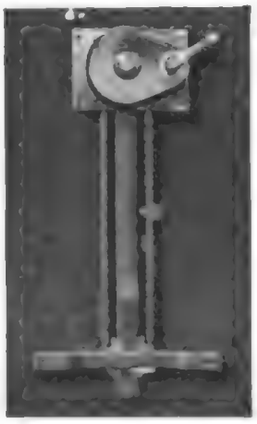
Immediate Delivery on Closed Body Hardware

It is of special interest to the body building industries that three types of Ternstedt Lever Door Locks and two types of Door Hinges are available for delivery.

These are of standard design and are now being used on many closed bodies.

The regular line of Ternstedt Closed Body Hardware is ready whenever you are.

Wise executives will specify requirements at the earliest possible moment, as 1920 production is going fast. Get in before it is too late.



Ternstedt Standard Window Regulator

Let us send you our new catalogue
It shows the entire Ternstedt line



Ternstedt Offset Window Regulator

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ARTILLERY AND MUSTER AVENUES :: DETROIT, MICHIGAN

MANUFACTURERS OF

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Window Regulator Handles
Lever-Lock Handles
Anti-Rattlers
Door Bumpers

Lever Door Locks and Hinges
Windshield Wipers
Curtain Rollers and
Other Closed Body Hardware

At the Commodore Hotel, January 3-10, 1920 **At the Congress Hotel, January 24-31, 1920**

A display of the complete line of Ternstedt Hardware will be shown at the Commodore Hotel, New York, January 3-10, and at the Congress Hotel, Chicago, January 24-31. You are cordially invited to thoroughly inspect this exhibit. Some new ideas in Closed Body Hardware, which never before have been shown, will undoubtedly be of great interest to all body builders and engineers. Come in and see for yourself.

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Motor Bodies and Parts

The Principles of Automobile Body Designing

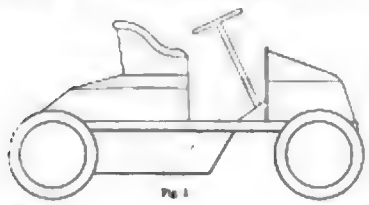
BY KINGSTON FORBES, M. E.

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Introductory Remarks

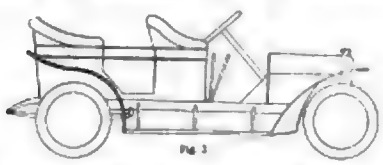
Since the time when the first gasoline engine was adapted to the road vehicle the progress of development of the mechanical features of the automobile has been rapid and sure, while the exterior features of the car, which can be classed as the running gear and the bodies, did not keep up with the development of the chassis.

When the chassis and engine had been



brought up to a high degree of efficiency attention was brought to bear upon the body and other features of the car that had any reference to the comfort of riders and the improvement of the car's external appearance.

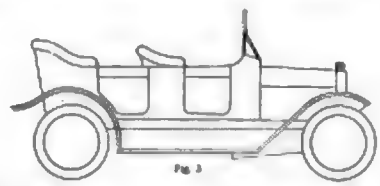
The possibilities for many improvements were soon noted and acted upon, the result being that the automobile departed from the ways and appearances of the horse-drawn



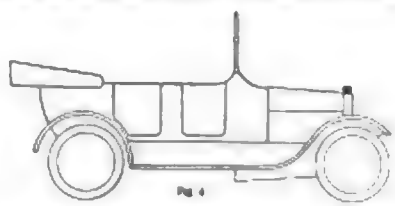
vehicle and took on a distinctive style of its own.

The change was revolutionary, as the passenger-carrying conveniences had been designed by basing the construction on the experience gained in making horse-drawn vehicles, and the new design and construction called for altogether different conditions.

A new industry of vast proportions was created which had to develop new machinery and new methods to cope with the requirements of the automobile body and its component parts. The methods used to manufacture, only a few years ago, seem crude when compared to the methods that are now in vogue; also the costs were high compared to the new costs. New industries have sprung up so quickly around some of the component parts that the great majority do not know about them, as few have had time to write about or describe them.

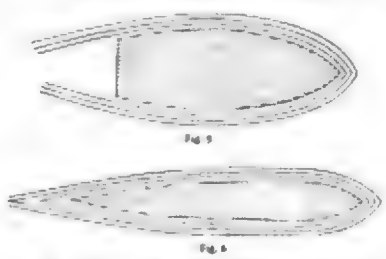


The various phases of development in the body and the running gears, as the other parts are called, will be dealt with briefly in this series of articles. These parts have now arrived at the stage where improvements are hard to make; and new designs are hard to create, and when this stage is reached analytical study is required to accom-



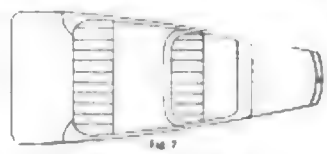
plish any further improvements. Progress is generally made by basing the developments on previous practice, and if the early developments are not known, the work is carried on upon an insecure foundation.

The aim of this series is to furnish the foundation so that past results can be considered while new ideas are being developed. That the time is here when a new field of effort is opened up is demonstrated by the



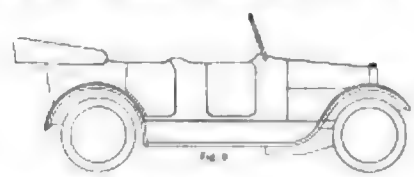
cars of 1917, 1918 and 1919, as shown at the automobile shows. These shows should be classed as body shows because the important developments shown in the cars over the previous season were in the refinement and improvement of the body design, running gear and equipment.

America's methods of manufacture have done a great deal toward the development of the automobile, as they have produced cars in vast numbers and at a price that brings them within the sphere of the majority of people. The result is that the cars are built in great quantities of one design, as this makes it possible to develop ways and means to produce cheaply. The development of the



automobile must necessarily hinge around that class of car that manufactures in quantities, and not around the special hand-made production.

The methods and designs that will be considered in the ensuing chapters are what is termed "in the manufacturing class," because in the majority of cases this type of car offers the greatest possibilities in its de-



sign, as the cost of tool equipment can be proportioned over so many cars that it makes conditions possible that the hand-made car could not endure.

CHAPTER I

Evolution of the Automobile

It is very interesting to trace the development of the automobile body from its early stages up to the present beautiful streamline designs. The first model, dated about 1903, consisted of a box-like structure with two seats on it, conveniently located against the steering lever or wheel. In Fig. 1 is shown a line sketch of a typical body of this period. This would be considered in present-day terms as a roadster, and is the prototype for our present two-passenger cars. Between the above period and 1905 a variety of body types were made and accommodations for two additional passengers provided. Some of these four-passenger bodies had a door at the rear for extra passengers to get in and out; this did not prove satisfactory as it cut down the room for a back on the rear seats, and the passengers had to sit face to face, making it almost a jaunting car effect. In Fig. 2 is shown a sketch of a typical car of this period. It will be noted that a great many corners and moldings are provided. The design savors a good deal of the horse-

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drawn vehicle, to which a buggy type of top is fitted. The car shown for the 1908 period in Fig. 3 has a body that is very similar to the 1905 period; the only difference is the slight improvement in outline and detail, and

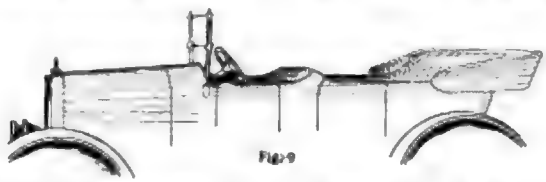


Fig. 9

a smoother line is shown throughout the design. In the 1912 style shown in Fig. 4 is seen the advent of the "four-door" type, and a windshield fitted as permanent equipment. The four-door type of body marks the coming of an "automobile" body and the breaking away from the buggy and kindred horse-drawn vehicle types. This body has capacity for five passengers and has four doors that open.

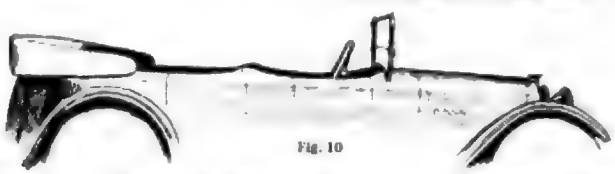


Fig. 10

The 1914 models show the streamline type of body. This has five passenger capacity and four doors that operate. The windshield brackets are set on the body and make the windshield a permanent part of the car. The dash is made smaller and the hood larger, so that the two are of the same size and present an unbroken line from the radiator to the back of the body. The name stream-



Fig. 11

line dates from this period when the bodies were made to match the front of the hood and present a clean, smooth appearance. The title "streamline" has been much abused, as any body that eliminated the offset hood and dash took that name. Boatline would be a name that would be more descriptive of the style, as the front end of the car is always the narrowest part, as in a boat shape. See Fig. 5, which illustrates a boat shape.

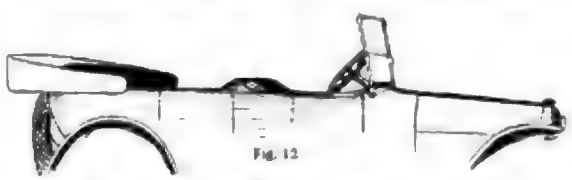


Fig. 12

A true streamline shape would take on the proportion of a fish or torpedo, the widest parts of this being the front end, as shown in Fig. 6. The theory of a true streamline body is that it will go through the atmosphere with the minimum degree of resistance; the air displaced by the maximum cross sectional area must be permitted to close back again without creating a vacuum. This is accomplished by the tail-like end of the fish or torpedo body. This is illustrated by the lines that are shown outside of the torpedo-like shape in Fig. 6. These lines represent air, and show how the air is parted easily and allowed to flow back to the natural condition gradually. In Fig. 5 the lines will be seen to leave a gap at the end of the body. This is a vacuum that this style of body would create and has a tendency to pull the body back. In Fig. 7 is shown a representative shape of a touring car body. This, it will be noted, has a decided wedge shape, and a vacuum-creating back. It is obviously impractical to adapt the torpedo-like shape to a touring car body, so that as a comparative name, the term streamline is a misnomer.

For the 1916-17 period, Fig. 7 shows the approximate type of car that is so familiar now. This has the long, straight lines with a hooded front set back. This tends to smooth down the necessary projection of the seat back and give the appearance of a continuous line along the top of the body. The projecting windshield brackets are also eliminated so that the windshield attaches to the body without any unsightly projections. This brief review of the body developments describes the periods when these changes went into general effect on the American cars. Some makers can claim that they had any one of these types several years previous to the times stated, and this may be true in a few cases, because up to a few years ago the European designs were followed by the majority of manufacturers. Consequently the general American styles, at the beginning of the great war, were several years behind the European ones. Since that time we have more than caught up with European design.

CHAPTER II

Modern Types of Bodies

The modern type of body is, without question, a so-called streamline one, and these lines are long and sweeping, with a clean cut line, without any projecting portions or surfaces. A body can conform to this description and yet be made in a variety of forms. The most modern body is a degree of design which has no rules by which its merits can be differentiated. The variations from the long, sweeping lines are many, and it is individual taste that determines their preference. In studying the body types that are marketed by the manufacturers for the last two or three seasons, it is found possible to divide the types into five divisions, viz: The first, the full-rounded type; second, the semi-rounded type; third, the angular type; fourth, the semi-angular, and in the fifth are grouped the miscellaneous types that have retained characteristic lines of their own.

In analyzing these groupings it is found that the full-rounded and semi-rounded types comprise 70 per cent. of all models, while those that retain characteristics of their own, in class five, comprise about 20 per cent. The other 10 per cent. are angular and semi-angular. If numbers proved the popular type, the full-rounded type would be called the most popular, but we find that in the small 10 per cent. class the designs are all new ones, which would probably indicate the trend of future design.

To illustrate the types outlined, two representative cars in each group will be shown in Figs. 8 to 18. Taking up the first group, termed the full-rounded type, Figs. 9 and 10 show typical examples in this group. Starting from the radiator, which has a round front and a rounded top, the curves are carried along the hood, shroud, and the sides of the body, almost to the back of the seats. This type predominates, and 40 per cent. of the cars use these lines. In the semi-rounded type, the radiator is round in front and generally the top of the hood and the shroud carry out the same round lines. But the decided curves stop at the front door, the sides of the body having a flat edge, and in some cases a bead or a small rounded corner. This type accounts for 30 per cent. In Figs. 11 and 12 are shown typical designs in this class. The angular type of design shown in Figs. 13 and 14 are "new" designs, the predominating feature being a decided tendency to flat surfaces and sharp corners. In Fig. 13 it will be seen that the radiator has sharp corners at the sides and at the top, and that these sharp corners are carried all the way back along the body. In Fig. 14 the sharp line starts at the radiator and extends as far as the windshield, and then run up; the back of the body has angular corners as well. In the semi-angular group, Figs. 15 and 16 are represented and show the predominating body lines to be long and straight, with a small rounded corner. These have proven very popular designs. In contrast to these already described, Figs. 16 and 17 show types listed in group 5. These have decided characteristics of their own which make them

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readily recognized. This group is rapidly dwindling, as the designs change. The predominating types are what are proving the most desirable and adaptable to the conditions they have to meet.

CHAPTER III

The Principles of Body Design

It has been shown in the preceding chapters how the designs of bodies for the automobile developed up to the present pleasing type, and in the succeeding chapters are shown how the present general designs vary to conform with the circumstances which govern the limitations of the design and capacity of the body.

The propelling and carrying structure of the automobile, which comprise the engine, frame, spring, axles, etc., are assembled into a group which is termed the chassis. The

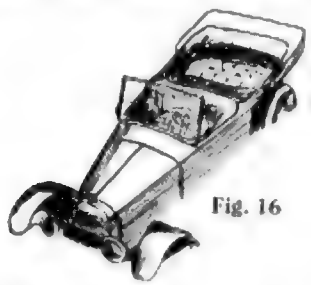


Fig. 16

chassis, then, is that part of the vehicle that the body must be adapted to.

The body of the car starts at the back of the engine and rests on the frame from the dash backward. The design is obviously governed by the chassis. Knowing the operating ability that is required, the engine and chassis proportions, the tire size and wheelbase are determined to give the desired ability. When this is done the body, hood, and fenders are designed to give the best appearance possible, at the same time to give the maximum of possible comfort. The proportion of the body becomes the principal consideration, as its design governs the proportions of the other parts that go to make to complete car appearance.

In Fig. 19 is shown a characteristic chassis layout, and it is apparent that the body must be back of the cylinders, and that it may extend to a convenient distance past the rear wheel. The front seat is located to provide a comfortable seat in relation to the steering wheel and the hand control levers. On a touring car design the available distance at the rear of the front seat is to be used to provide a comfortable rear seat. Comfortable seats can be made in a variety of ways and the room available will govern the methods used to obtain them. In Figs. 20, 21, 22 and 23 are shown average seating conditions under different circumstances. It will be noted that the higher the seats are, the shorter the distance is from the dash to the seat back, and the lower the seat is, the longer this distance has to be.

The average seating position, for a five-passenger car, taken from a large number of cars, would be the condition shown in Fig. 24, and a seven-passenger seating position as shown in Fig. 25. The seating conditions have to be worked out to suit the cars, and these vary a great deal, because of the different types and sizes of engines used.

There are four main types of engines in use, the four, eight, six and twelve, and these all give different conditions that effect the body design. In order to properly analyze these conditions the diagram in Fig. 26 has been made, and this shows an outline of a typical four-cylinder car. The main conditions that effect the body design are the parts that are divided off at A, B, C and D.

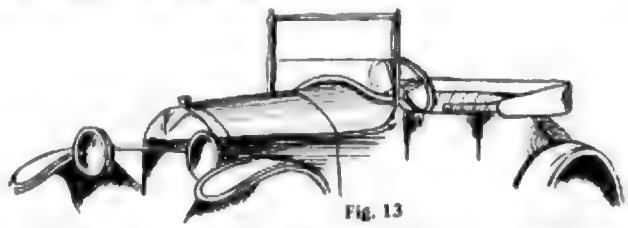


Fig. 13

No. of cyl.	A	B	C	D
6	88	28	37½	125½
6	84¼	26½	37¼	122
6	87¼	26	36¾	124
12	87	26¼	35	122
12	95	26¼	40	135



Fig. 14

These symbols are used so that a number of different cars can be measured and tabulated under these letters. The figures for three popular four-cylinder cars and two eight-cylinder cars are shown under this form:

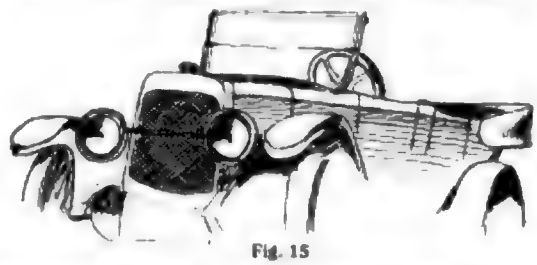


Fig. 15

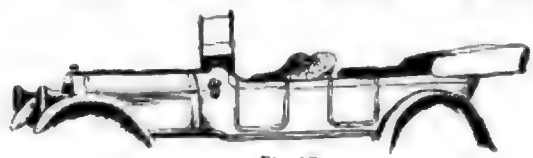


Fig. 17

No. of cyl.	A	B	C	D
4	79	18½	27¼	106
4	76	20	28	104
8	91	26	31	122
8	89⅛	24	30½	120
4	86½	20	28½	115



Fig. 18

In Fig. 27 is shown a typical outline for a six-cylinder car. The outline of the hood is noticeably longer and the wheelbase increases accordingly. Three different six-cylinder cars and two twelve-cylinder cars have been measured up and the dimensions tabulated:

By comparing the figures of the four-cylinder cars against the eight, it will be noted that the lower figure being 76, and the higher 91, there is a difference of 15 inches in dimension A. In dimension B the difference is 7½ inches; in C there is a difference of only 3¼ inches, and in the wheelbase the difference is 18 inches.

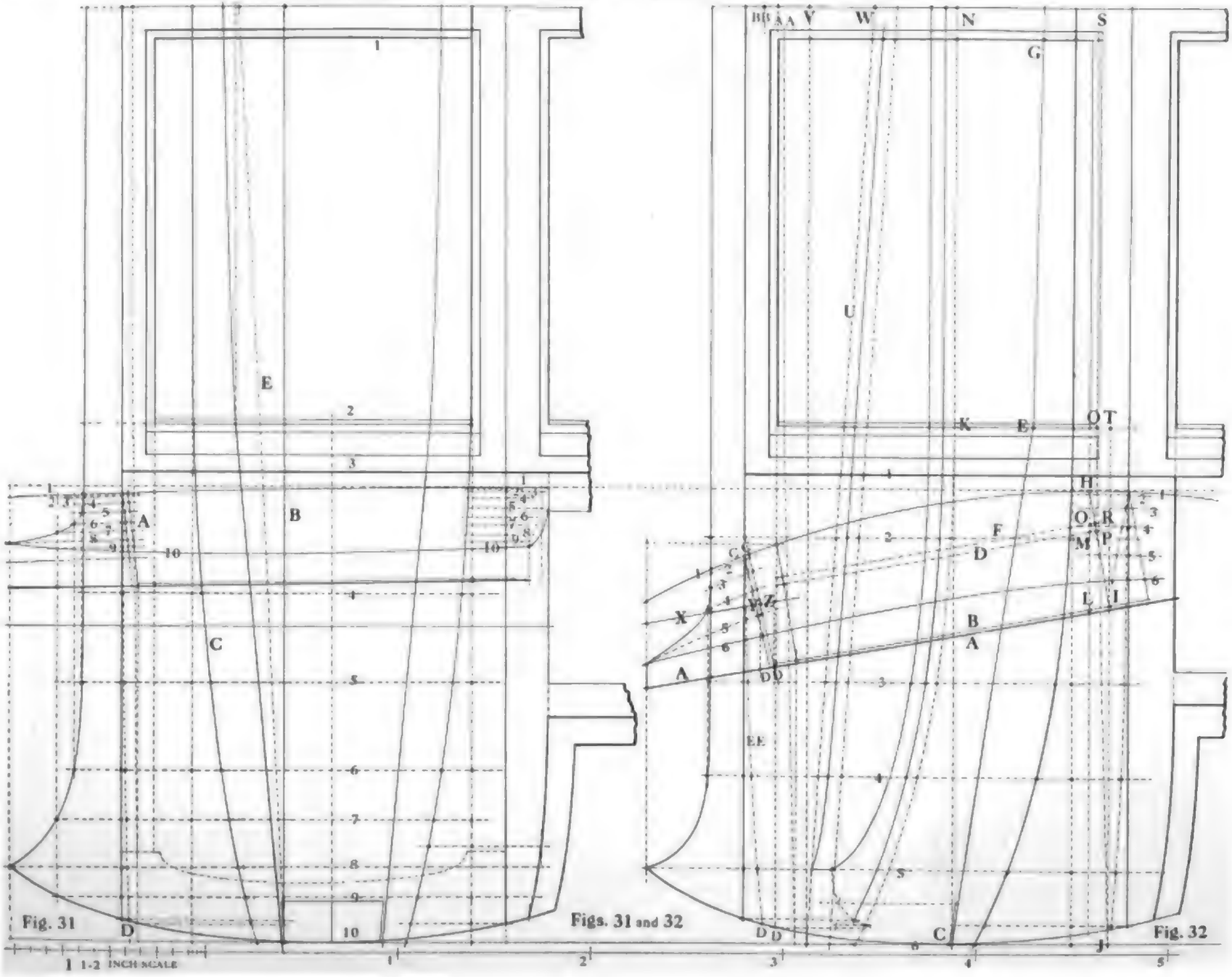
In the same way, by comparing the six-cylinder car against the twelve, we note a difference of 10¼ inches, the lowest being 83¾ inches and the highest 95 inches. Dimension B varies 2 inches, and dimension C, 5 inches; the wheelbase 13 inches. The main body dimension A runs from 76 inches on a four to 95 inches on a twelve, this big differ-

(Continued on page 52)

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Part E——Lessons 31 and 32. The Contracted Brougham and Limousine Doors

(Continued from pages 34 and 35, December, 1919, of "The Vehicle Monthly") *(For description see page 31)*



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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Hoergeist, Technical Editor and Draftsman of "The Vehicle Monthly."

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Subjects Treated in Previous Numbers

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" — " 3—Framing a Round-Cornered Seat
" — " 4—Laying Out and Framing a Two-Passenger Seat
" — " 5—Laying Out and Framing a Twin Seat
" — " 6—Constructing Round Cornered Seats with Strips and Boards
" — " 7—Constructing Round Cornered Seats with Horizontal Joints
" — " 8—The Laying Out of Proportional Corner Curves
" — " 9—Establishing the Concave Surfaces of Seat
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Part E——Lessons 31 and 32
The Contracted Brougham and Limousine Doors

(For Working Draft see page 30)

EXPLANATION. Figs. 31 and 32. On broughams, limousines or coaches, the rockers are usually more or less contracted. Because of this, changes occur which are of great importance in body building and should be perfectly known in order to avoid mistakes.

The inside surface of rocker, Fig. 31, is square vertically and lengthwise, but on the outside surface it is inclined and a trifle contracted. The inclination is the same as on the inside surface of door pillars, and the amount of contraction is caused by the varying outside widths of body. On doors where the rockers on outside surface are not contracted the door pillars are dressed square on inside surface and square across the body. If there is a side curve on body the dressing of the pillars must correspond with that curve; but when contracted the pillars in most cases are dressed square with the outside surface of rocker. On Fig. 31 the contraction is small and will be further explained on Fig. 32.

DRESSING OF THE COUPÉ PILLARS.

The door hinge pins are generally outside the body surface and to open the door the coupé pillar must be beveled; otherwise the door will not open. This bevel is shown at A. If the coupé pillar is dressed in a vertical direction as on B, and the bevel planed as on A, dress the pillar as on turn-under line C; the bevel above the belt rail will be vertical but from belt rail molding, it will turn into the dotted line at base of door; therefore the door is narrower as indicated on point D. If the coupé pillars are dressed after the inclined line E and beveled after A, the bevel must be reduced the amount it is inclined from surface A, or from front surface of coupé pillars. This will be explained in Fig. 32 as this is very important.

On Fig. 31 the contraction is far greater and therefore the difference in dressing the door and coupé pillars is more clearly seen.

A is the outside contracted line of door rocker; B the inside contracted line of door, both taken from the base at point C. Dotted line D is the inside surface of door pillar at fence rail E, and dotted line F is the inside surface on top of door G.

Lay triangle on point H square with contracted door line B, to point I; from point I square down to point J. Take distance from point K, which is the vertical line starting from point C at base to E on fence rail and put this space from point L to point M. Take space from point N on top of door to point G and carry it to points L and G. Repeat same operation on front door pillar and from these points the contracted dotted lines D and F are made. Square up point P connecting with D H I up to point Q on fence rail, also square up point R to point S, top of door. Connect point S with point Q and point Q with point J at base. Square up point J to point T and from point Q to point T is the amount the door is out of square when contracted and inclined, as shown on Fig. 32. To prove this make a door as shown, square it from upper outside surface; put square on inside and lower surface from fence rail downward and lower part of the door will correspond with line on points J Q and fence rail.

If the coupé pillar is vertical on inside surface, the pillar is dressed after contracted line A, square across front surface and after lines C C, D D. Incline this pillar after line U; it will throw the pillar from point V to point W on top. Take this distance from V to W and carry it from A to X. Take space on line X from point Y to Z and put it from point A A to point B B; connect point B B with point D D, on bottom view, which is the inside lower corner of coupé pillar when inclined after line U. If this is not done the pillar on top will be too large from point Y to point Z and must be deducted on top of pillar on points A A, B B. Square down points 1, 2, 3, 4, 5, 6 from intersections of line C C, D D, and the result will be line E E, which is the front door joint.

PROBLEM. Fig. 32. Cut a block from base line to fence rail, incline after line C, E; Fig. 32 cut bevel top and bottom surface after inclined line C E. Set bevel to the contracted line, mark it top and bottom on the four corners and cut both sides to this bevel in a vertical direction. Mark the inside surfaces of door pillars H I, Fig. 32, on this block, from which line Q J is obtained. This problem is not used in practice, and the only way to learn it thoroughly is to cut the block as directed, that the difference of the change can be seen.

PART E.—LESSONS 33 AND 34 WILL APPEAR IN THE FEBRUARY NUMBER OF "THE VEHICLE MONTHLY"

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Runabout Bodies with Curved Surfaces, Their Design and Construction

Combining the Cowl with Center Part of Body to Partition

[In the December number of THE VEHICLE MONTHLY appeared two articles dealing with the curved surfaces of runabout bodies and the designing of hoods and cowls. The subjects are continued on this page, illustrated with working drafts. EDITOR]

The half front elevations on this draft are the same as on half front elevation of hood and cowl draft, except that the curves from 10 to 13 are added. Sectional line 13 on side elevation and top view on center part of body is the extreme width across and from 13 the side curve narrows down to front end of hood and rear part of body.

All points from cowl and body are squared over in a horizontal direction from half front elevation to side elevation and from side elevation to half front elevation. The same from half bottom view to half front elevation.

On this draft vertical line 4 is the dash line; vertical lines 8 and 12 are the front door joints; U, the upper part of cowl; V V, the upper curved part of body. The inclined dotted line W is the partition between the front and rear parts of body, and the back for the front seat is fitted against this line. This partition, while inclined, has not the same amount of turn-under and shape toward the sill as the vertical turn-under line 13, and the top curve must correspond with half front and back elevations.

Both of the curves should be shown on half top or half bottom view, and both curves must be taken from extreme outside line of body on both half front elevation and half top or bottom view, which is done as follows: A A, half top or half bottom view, represents the amount of turn-under toward the sill, and starting from points W, side elevation. B B, half top or half bottom view, represents the rear upper curve of body V, side elevation. These two curves are shown on A A, half top or half bottom view, and B B, half front elevation, indicated by a heavy line from top to bottom.

Square down the thickness of the partition W from the two points on bottom of sill, side elevation, to two points C C, half top or half bottom view. These two points give the position on line T, which is the outer bottom edge of sill. Square down point D D and E E, side elevation, back surface of partition, to half top or half bottom view; take amount of turn-under on D D and E E, half front elevation, and carry the amount to points on vertical lines F F, G G, and extreme side curve of body L, intersecting with points on dotted line A A. From these four points dotted line A A is made, representing the turn-under line of the partition W, on side elevation. The upper curve across the body B B, as shown on half top or half bottom view, is made in a similar manner to that explained above

Square down points H H, from top, front and rear partition, down to point on center line, the thickness of the partition being added after curves A A and B B are made. To obtain the top curve on bottom view K K, square horizontal points H H, K K, L L, M M on line W, from points rear of partition over to H H, center line. K K, L L, M M and N N, half front elevation, up to the vertical dotted line at the left. Take distance from point K K to B B, half front elevation, and carry it to half top or half bottom view, from point on horizontal dotted line L to point K K. Take distance from point L L to point B B, half front elevation, carry it to half top or half bottom view, from point on horizontal dotted line L to point L L.

Take distance from point M M to B B, half front elevation, and carry it to half top or half bottom view, from point on horizontal dotted line L, to M M. Point N N, on vertical line 13, side elevation, is taken the same way as the other three explained above.

Make line O, from point H H, rear of partition, side elevation, down to center line. Also make line P from points H H, side elevation, back of curve on center, making a curved line corresponding with the rear of the curves. This piece on H H is glued against the partition.

There is another curve from V down to top of door. This curve, like the others, turns toward the center of body, and is made as follows on half top or half bottom view: Use vertical division lines on side elevation and half top view, 12, 13, 14 and 15. Take distance from point N N, to point on heavy line X, half front elevation, and carry it to vertical lines 12 and 13, from outside curve of body L to points on dotted line Y, half top view. Take distance from point M M, to point on heavy line X, half front elevation, and carry it to vertical line 14, from outside curve of body L, to point on dotted line Y, half top view. Take distance from point L L to point on heavy line X, half front elevation, and carry it to vertical line 15, from outside curve of body L to point on dotted line Y, half top view.

Now make curve Y, using the five points to O and center line. Dotted line Y represents curved line V on top view, side elevation; and the inside line which runs parallel with Y and O is the thickness of the piece on top of body and the partition.

There are three different curves explained above; one is the turn-under curve, amounting to 6 inches at bottom surface of sill, shown on A A, half top or half bottom view. The second is the rear top surface of partition, and the third the top surface of body on curve V, side elevation, producing curve Y and O on half top or half bottom view.

This is the first time that the position of these three curves has been illustrated and explained in print, to our knowledge, and in practice to obtain the two curves for piece Y and O, another illustration is necessary to prick off the side curve and curve across, one of the most difficult pieces to dress and fit to the partition and hinge standing pillars. For this reason it is best to make it out of two pieces to save time and labor, but we shall illustrate this in some future number.

The other draft, treating on the combination of hood and body, has been thoroughly explained from vertical lines 1 to 9, and on this draft we have designed the entire cowl part from vertical lines 4 to 16, so that the combination is better understood in practice.

To make this addition all intersections are made to produce true lines on all elevations, top and bottom views. The top and bottom views show definitely if one point is a trifle out of line; it will show that there is a deflection in the curves on one or both of the curved lines on half front elevations. Consequently on this draft we only had to extend the lines from vertical line 9 to vertical line 16. The working draft of rear part of body will be explained and illustrated in the next working draft.

Combining the Center and Rear Parts of Body and Obtaining the Curves from Partition to Rear End

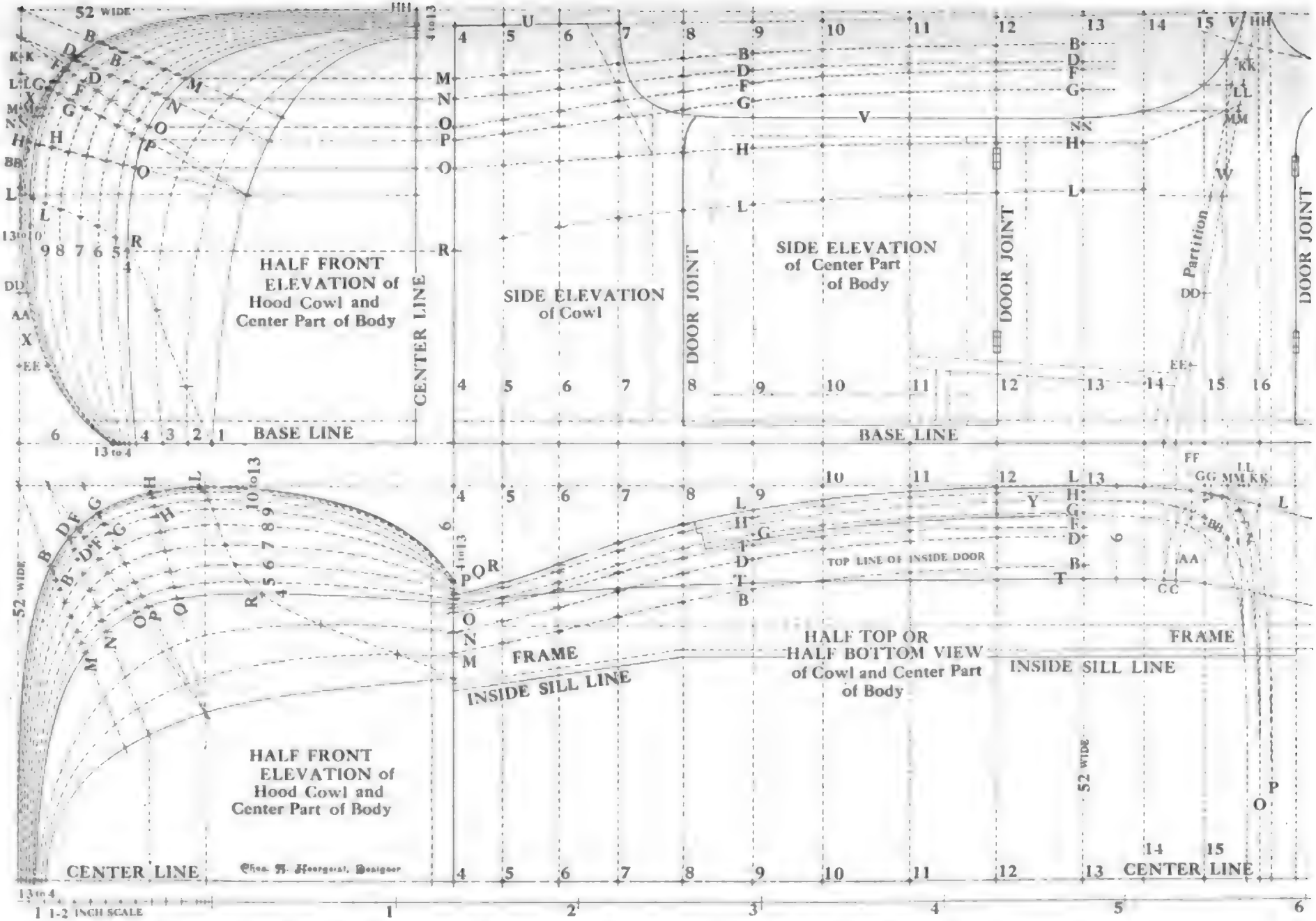
The rear part of bodies is built in different ways; some have side doors while others are built without them; again some have a disappearing seat, and some are built without; in that case the entrance to the interior of body is made from rear end. Some are nearly square on top and on outer edges of body down to the frame, while others have a medium or full curve. Others finish with a point at center of rear end, and lay flat on the frame, while others are rounded from all sides. We do not illustrate the angular built runabout, but while the majority are built in angular form at rear end they are easy to build. Therefore we confine ourselves to the medium or full round curve, and also to the full round rear end curve, which is more difficult both to design and to build.

On the medium round runabout, as shown on this working draft, the upper curves, except the extreme rear end one, are all alike, while on the full round with rear round end they are all different. But the turn under curves on all of them have different curves, from front of hood to rear end of body.

The object in view is to obtain the exact curves needed at a certain position from front to rear end of body in the most certain and the easiest possible manner. The sectional division lines on all these drafts, and in fact on all body builders' working drafts, are most important and decidedly necessary, because they act as a guide from elevation to elevation and from top or bottom view to the different elevations.

The rule for obtaining the points on any

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COMBINING THE COWL WITH CENTER PART OF BODY, UP TO PARTITION, AND OBTAINING THE CURVES. (See description on page 32.)

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sectional line on all the elevations and top or bottom views is as follows: After the side curve A, half bottom view, has been decided on, and also the curve and amount of turn-under on B, half back elevation, make line C, side elevation, parallel with top of body D, ending at point 30 at extreme rear end and bottom of body. If line C is drawn further downward on side elevation, line E, half back elevation, moves downward in proportion, because all points at intersections from line C are squared over, same as all points from upper outside line of body D, as shown by horizontal dotted lines, intersecting with points 16 to 29.

Line F, side elevation, represents the widest part of body and must be shifted always to widest part of body on half back elevation from where the turn under lines start at each sectional line; running also in a true curve to point 30, bottom surface of body. Give 6 inches turn under at 16, half bottom view and make line G, representing the outside bottom edge of body on base line, side elevation, running gradually into point 30 and center line. To make line G requires good judgment, as it must partly conform with the outside curve of body, but gradually runs in a true curve into point 30 and center line. All these points on each sectional line are transferred from bottom view over to base line, half back elevation, from 16 to 29.

Square all points from 16 to 29 on line F, side elevation, over to half back elevation from 16 to 29 crossing the widest part of body at each sectional line. Line A, half bottom view, represents the widest part of body and these widths are transferred over to half back elevation in a horizontal direction.

Line H H, half bottom view, is made to run through the upper curve of body and can be moved either outward or inward and two or three similar lines can be established. On this draft, line H H runs parallel with outside body curve A, and all the intersecting points on sectional lines are carried over into the half back elevation. Also all the widths at each section from center line. In fact, all widths across correspond at each of the sectional lines at each number on either half back elevation or half bottom view, or in other words all the widths corresponding with the same numbers are alike, showing that the system as illustrated in those drafts is correct in every particular.

If one point in any of the elevations, top or bottom views, does not meet in others, it shows there is something wrong and needs correction in making the draft. If line H H, side elevation has been made, all points and numbers on sectional lines are transferred over to each point on half back elevation, corresponding with the same number as in side elevation, creating line K as shown on half back elevation. From these four points the upper curves and lower turn under curves are made. For instance, take dotted line 29, half back elevation; start at point 29 and center line; to point 29, intersecting with line F, to point 29, intersecting with line K; and point 29, intersecting with base line. Use point 28, which is squared over from sectional line 28, intersecting with heavy line D, side elevation, to point on center line 28. From there run over to point 28, intersecting with 28 and line E; from there to point 28, intersecting with line K; from there run to point 28 and base line.

All curved upper lines from 28 to 16 are alike, except that 29 has a different curve, which simplifies the construction of working drafts; but all the turn under lines have different curves, 29 having the least and 16 the most curve. These turn under lines are graduated with the turn under pattern by shifting it gradually into 29, turn under line.

Because the frame is raised at rear end the body is fitted into it. Line O, side elevation, represents the raise, and P, on half back elevation, represents the same amount of raise. This amount of raise is reflected on half bottom view. Heavy line G, half bottom view, represents the width of body on outer body edge; dotted line L represents the outer body edge on the raised frame O, side elevation, line L runs into point 30 on center line, half bottom view. Dotted line Q half bottom view represents the upper outer edge of sill on door; and dotted line M, half bottom view, represents the upper beveled edge of sill, ending also at center line, point 30, half bottom view. Heavy line R, half bottom view, represents the inside sill line, consequently the entire sills can be pricked off from front to rear end.

The upper door and trap joint on this draft is shown by heavy line N, half bottom view, and is reflected by heavy line S from 17 to 23 on half back elevation. Door standing pillar T, side elevation, is beveled after outside body curve A, and on top after body top line D. Pillar V is framed in one piece across the body, and on top is beveled after body top line D, and on the side of body after A, and the width across and side bevel are shown on W, half back elevation. The bevels on the two strainers are taken the same way and if made in one piece 25 and 27 are used to mark the curve. Strainer 25 is marked from front end surface and strainer 27 is marked from 27 and bevels added; but the bevels are opposite each other, because one is marked from front surface and the other from back surface.

Rear pillar A A, side elevation, is shown on B B, half back elevation, and on C C, half bottom view. On account of the side and top curve of body, the rear pillars, notwithstanding they are in a vertical direction, cannot be dressed after the top curve of body D, and the curved lines must be created and specially made to meet the side curve of body D. There are three pillars, one in the center and the two others on the side of the body. The center pillar is dressed square after top body line D. On the two others the shape and bevels must be created as follows: The top surface of pillar between 23 and 24, side elevation, is nearly square, as shown on D D, half back elevation, but at E E, half bottom view, the pillars must be beveled right and left after side curve of body A on E E.

How to Obtain the Shape of Pillars

Square over points D D, half back elevation, to points on vertical line 24, side elevation. Square over points F F, half back elevation, to points on vertical line 25, side elevation. Square over points G G, back elevation, to points and vertical line 26, side elevation.

Square over points H H, half back elevation, to points on vertical line 27, side elevation. Square up vertical line 28 and K K from bottom view to points K K, and L L, bottom of body, side elevation; representing the side bevel on bottom surface of body. Make a curved line from points on vertical lines 24, 25, 26, and 27, down to bottom surface of body A A, and L L. Here is not only the shape of the pillar but also the bevel top and bottom, and the pillar must be marked from two sides by shifting the pattern. But it is more correct to square the bottom surface of pillar and mark the bevel across.

Dotted line M M, vertical line 27, and base K K, side elevation, is the inside pillar line. To obtain the shape and bevel of these two pillars right and left, is as simple to accomplish as the other curves, by carrying over the points from half back elevation to side elevation, and from side elevation to half bottom view.

The figures which are on rear bottom section of body are the same as on half bottom view and in practice are not made, but we want to show how handy it is to square all points from rear bottom section up to half back elevation.

Rear bottom section of body is same as half bottom view of rear part of body, but we reversed this section, hence all the points can be squared up into the half back elevation.

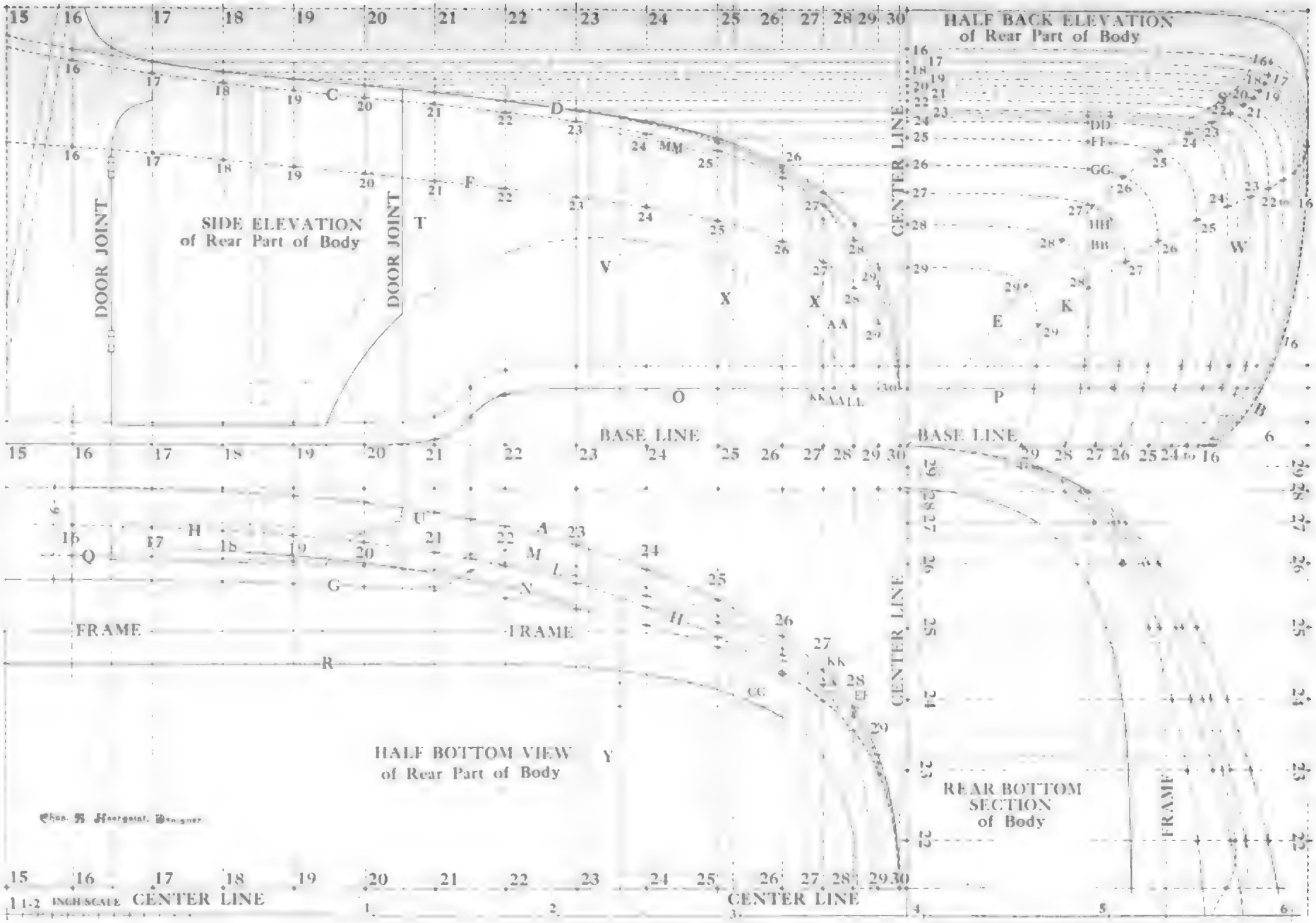
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There is big business for you in the distribution of Mulholland bodies in your territory. Write for a catalog showing all the different body combinations.

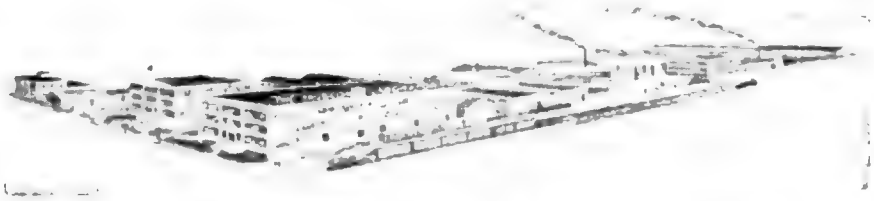
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COMBINING THE CENTER PART WITH REAR PART OF BODY, AND OBTAINING THE CURVES FROM PARTITION TO REAR END. (See description on page 32.)

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Painting and Finishing

Drying, Binding and Thinning Mediums

The vehicle painter is chiefly concerned with what he has from times remote been taught to call coach japan. There are on the market today materials termed driers and japans. Likely enough the original difference, if there ever was really any great difference, between the two mediums is represented by the fact that coach japan carries a varnish ingredient while driers have lead and manganese compounds of linseed oil dissolved in linseed oil; also that the lead and manganese compounds combine easily with rosin, or colophony, to form resinates and that these act in the same way when dissolved in oil or varnish. All these combinations when completed are termed driers.

There is certainly no very sharp line used to divide driers from coach japan. Japan, as usually defined, is a liquid which, by itself, dries to a hard film. This is usually produced through a combination with some of the varnish resins. This compound partakes of the nature of varnish; indeed, some of the japans in which colors are ground are practically varnishes heavily charged with lead and manganese. A good coach japan invariably has a drying effect.

One of the most to be desired features of a coach japan is its mixability with pigments without chemical action. One may hear much about the curdling of japan, a condition which is roundly condemned, as a rule. Experts declare that it is an easy matter to make a japan which will not curdle, but such a japan is said to have little value as a grinding medium.

The deposition of sediment or "foots" from a clear japan almost always arouses the suspicions of the painter. But it does not necessarily indicate an inferior drying medium, although, naturally, we should prefer a japan entirely free from these settlings.

It appears to be a common belief that a japan should mix with raw linseed oil in practically any proportion without clouding or the precipitation of any of the ingredients. This, however, is an erroneous opinion because a japan that will so mix without clouding is sure to contain little or no lead, which is the ingredient that should very largely be present in a good drying japan.

The essential test of a japan is along the line of its drying capacity and its facility for mixing with all pigments free from chemical action and without discoloring the paint or color. This is the determining factor, and this alone should decide for the painter the value of the medium as a drying compound.

The test of the japan might be hedged about with a mass of technical detail, but above the skyrockets of confusing phrases there are only the factors here referred to which count enormously.

Just at this time when raw linseed oil looks like a rare treasure over a price quotation of not less than three bristling figures, it is the common practice to advocate something cheaper for use in the painting of vehicles; but is it actual economy to use a substitute for this old and tried friend of the vehicle painter? In the vehicle paint shop no great amount of oil is at the present time being used, and we cannot understand why in the use of this restricted quantity a substitute should even be mentioned.

Raw linseed oil for a generation or more past has been universally recognized as a paint oil without an equal; it has binding properties which have been established through a long season of consistent use. It is recognized as a big factor in the life of the paint. It imparts to the pigment and to the finest colors an adhesive and supple quality not to be obtained through the use of any other known medium. For this reason we can see no excuse for substituting another medium concerning the properties of which we know little.

The finest color should have—speaking now of the japan ground pigment—a little oil as a binder and to give it a faint lustre and to bestow upon it a pliability and suppleness so necessary to insure durability.

The late C. A. Willey, long time foreman painter with Brewster & Co., New York, used to urge the employment of a few drops of raw linseed oil in all coach colors japan ground. He advised the use of one part oil to three parts turpentine in color for first coats to be used as preparation coats.

There are not a few substitute oils on the markets today which are recommended as just as good as the pure raw linseed oil for the uses which the vehicle painter has for oils in his business. But we are free to say that raw linseed oil stands alone and above board, with its merits unchallenged, as a medium designed for vehicle painting uses.

Almost in the same vein are we inclined to speak with reference to turpentine as a paint and color reducing medium, and as a thinning medium in general. Turpentine has no equal as a thinner for fine and delicate pigments; it is adulterated, unfortunately, and it has imitators diplomatically termed substitutes, but never an equal.

Hence, in a brief word, we say buy the pure article. At any rate, refuse the adulterated article. To be sure, there are many good substitutes, but none equal to the pure article. And the real thing is none to good for the business of automobile painting.

Effective Brush Work Indispensable

The Vehicle Monthly has in previous issues called attention to the results arising from faulty brush work. The surface defects due to this class of work are almost too numerous to mention. The journeyman vehicle painter is supposed to be thoroughly competent to wield the brush correctly; this is his chief asset, and if he fails to make use of it or is lacking in the qualifications of a good brush user his value to the business is proportionately undersized.

One of the first things which the beginner in a paint shop should learn, as he makes progression to the dignity of handling a brush, is to hold the brush correctly and then use it effectively. Some foremen painters claim that they are able to pick the real brush man by the manner displayed in handling the tool.

Proper Handling of the Brush

One of the first things to be learned in connection with holding the brush is the actual method of taking the tool in hand. This is very important for as one learns to hold the brush so he is ever after most likely to continue to hold it. The proper way is to take the handle of the brush between the thumb and the first two fingers of the right hand—we are now speaking to right-handed men.

The handle of the brush should lay against the side of the second finger, with the first finger lying partly over the handle, with the thumb acting as a control lever. The handle will slide easily against the side of the second finger just back of the first joint.

In this position the brush is at all times under the perfect control of the person holding it; in this manner it is not rigidly held. The brush is working easy and yet held securely, with all the wrist action in full play and the muscles of the fore arm and the fingers involved acting supple and plastic.

By a little practice this way of holding the brush will become second nature and the best possible efficiency developed and maintained. Under no circumstances can the brush held rigidly and inflexible be made to perform its proper functions. When thus operated it completes what in shop terms is called "scrubbing" the paint or material on the surface.

To lay on color or paint with the brush thus held is simply a cold, mechanical process and is quite incapable of bringing out any of the finer qualities of the material. Color brilliancy depends to a greater extent than it is common to admit upon the way it is handled in the brush—flowed out and touched lightly abroad the surface. All this is secured only when a supple and nimble handling of the brush characterizes the workman's control of it.

Surfacing Above the Color

If the primary surfacing has not been neglected surfacing above the color should not prove a very difficult job; if the early surfacing has, however, been neglected there is certain to be plenty of hard work to be performed above the color.

It is not a wise practice to depend too much upon the surfacing that may be applied when the varnish coats go to their appointed place, for at the least it comes to a stage of the painting process when the surfacing costs at the maximum.

It is always correct procedure to begin at the priming coat to get results. The good foundation is only secured when it is founded upon bed-rock, which, in the case of the painted surface, is the surface before it is first coated.

The surface made clean and receptive to the priming, furnishes, other things being equal, the only durable foundation. This coat if brushed on smooth and dry and minus fat edges, wrinkles, etc., will prove fit and secure.

Fetch the other coats along in the same manner until all the roughstuff coats have been placed in position. Let these latter be applied at right angles to each other; that is, lay the first coat vertically, the second horizontally, and vice versa.

In this manner you are sure to get a close, compact knit fabric of material with all places filled up and made more nearly level. This latter quality in a surface is very essential if we would secure a body of roughstuff capable of being rubbed to a perfect state of levelness and smoothness.

A Smooth, Level Surface Essential

Unless we have a smooth and level surface after rubbing the roughstuff we may count on having a merry and expensive time developing a surface out of the rubbing varnish. It is impossible to get all this out of the primary surfacing only when the various coats of material have been most expertly shaped and developed.

Good rubbing of the roughstuff must go in as a part of the primary surfacing. The rubber should have not only a good working knowledge of reducing the roughstuff to a true and level condition, but he should also have an enthusiasm for the work.

Plenty of water is one of the elements in the rubbing which should not be neglected; perhaps elbow grease is another, although not as much of the latter is really needed as was once demanded.

The stone should be held to the surface with simply a firm, true grip, with just enough pressure to keep it working clean and well. The flow of water will wash the erosive substance and the ground roughstuff from the surface, thus preventing scratching and cutting.

Direct the rubbing strokes all one way, this will reduce the danger of defacing the work and will likewise face up the surface in a better condition than would be the case otherwise. Circular motions of the stone are likely to bring out curlicues and sweeping line scratches which are not so easy to rid the surface of as one might at first thought conclude.

The main thing—the indispensable thing, in fact—in rubbing roughstuff, is to get a surface both level and smooth and perfectly free from gouges and mars and defects. Bearing down heavily upon the rubbing stone is a prime cause of scratching the surface and of doing coarse, badly detailed work. At all times the rubbing stone should be kept running free and clean and held at a pressure adequate to secure clean and fairly rapid results, with, as before stated, smoothness and levelness and freedom from defects the main features to be considered.

The rubbing may be greatly simplified by giving due attention to the consistency of the material applied. The roughstuff heavy and ropy and lying in welts on the surface is no longer permitted by the best class of painters.

Thinner coats, with an extra coat when required, are found to yield the speediest and finest results. Such coats may be brushed out smoother and with greater uniformity, and they lay in more closely and compact. With a foundation made up with this class of material it will be learned that a more perfect and economical surface may be secured; time and labor will be less and the results are certain to prove more durable.

It should not be a difficult work above a foundation of this character to secure a finish at all points satisfactory. If the color and the varnish-color are laid circumspectly and with a definite purpose of rounding out the finish with the least possible outlay of time and labor and material, the work of reducing the rubbing varnish coats will be largely cut into.

As stated in a previous issue of THE VEHICLE MONTHLY it should not be required to strip these coats unduly. They should be allowed their maximum body and capacity for holding out the finish, and if the primary surfacing has been attended to as above detailed, this will prove a matter most easily disposed of.

The first coat will need only the sharp lustre taken off; the second coat will take the bulk of the rubbing, although this should not be hard, close reduction. If more than three coats are to go on the close rub may well be deferred until the third coat. Rubbing the last coat should be merely enough to clear up the surface and refine it.

No color should be used at a consistency which results in a surface face at all coarse, brushy and harsh in its film. In color application there should be a fine, satin finish of the film, when the color has dried down. Anything short of this may be accepted as unsatisfactory. Indeed, it will be written down as such by the fashionable folk who take their exercise within the luxurious confines of the big car.

The refinement to follow comes in the form of the varnish-color, mellow, soft, clean-flowing and rich in its body, brilliancy and reflective quality. And in the last word there is nothing quite the equal of varnish-color to fetch out all the infinite charm of the color.

Colors and Striping for the Big Car

This is not so easy as it sometimes looks to an outsider. The big car, unlike the smaller type of car, does not appear to the same advantage in all colors. The little or moderate size car will accept almost any color and not show an ugly face. In opposition to this, the big car must be studied with reference to its outlines, size, type, etc.

Not a few of the lighter colors bid defiance to all correct rules of employment if disposed of on the surface of a large car. The car of the lighter type, for example, rolls forth radiant and becoming in any of the light-toned pigment.

These same colors applied to the large car, a limousine, say, will make the car appear a third larger than it actually is. Any of the yellows will perform the same undesirable service for the big car. Some of the lighter browns, and a few of the flaming reds—many of them, in fact—will do the same thing on the wide sweeping surfaces.

Indeed, the big car, with almost no exceptions, will appear at its best, from the color standpoint, attired in the dark, subdued pigments which exercise a diminishing effect upon the surface.

Employment of "Negative" Colors

Colors which are negative in their effect upon the surface will prove acceptable upon the big car, but in the use of these pigments discretion will necessarily have to be employed because, for the most part, they lack a positive effect and appear dormant, a fault which can hardly be excused in an automobile color.

All of the dark, rich, elegant pigments, such as maroon, black, blue and green, have a distinction when used upon the big surfaces to be witnessed nowhere else. Some of the darker reds, but withal brilliant ones, shine gloriously upon the big surfaces, especially if striped with lines of black, or still deeper reds. Greens may be used without offense until they verge almost to the shade of pale green, provided the big surface is then striped with deeper shades of green or black.

In the choice of striping colors for the big car another difficulty presents itself. These colors should never be chosen from among the pale or lighter pigments, with the bare exception that when so selected they be used in fine lines, either single or double. If employed in heavier cast they give the surface a loaded down appearance and increase to the visual sense the size of the car.

Many big cars have appeared on city streets the past season with wide stripes around the upper edge of the panel; this brings the car seemingly nearer to the ground, but adds to its size, optically.

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Surfacing Plans and Practices

These are many and some of them intricate; so much so, in fact, that they have in many shops been discarded altogether. But so long as the fissured surfaces exist we are fated to have due excitement in the problem of getting a new finish in place without removing the old paint and varnish structure. It is understood, of course, that this new surface piled up over the old cracked one cannot well be anything short of a substitute, a temporary makeshift.

But men reason that so long as it will face up the old finish and give a new one that shall last for a considerable length of time and in a form to fool the very elect, it is real economy, as in fact it is. And so the painter is left to invent some method by which the fissures may be filled up and made presentable.

It was only recently that the writer was told that the old-time anti-kalsomine, the binder or fixer of which is cement, mixed to a working consistency with hot water, and applied hot to the surface, the first coat to be allowed to stand over night, with a second coat to be applied the next morning, this coat to be likewise hot, will close up the checks and produce a foundation to finish upon in every way satisfactory.

This anti-kalsomine, as the writer knows from experience, is a most surprising crack filler, and when applied hot it goes right in and stays there and seals up the fissures in great shape.

The old-time way of the cutter surfacer in handling this anti-kalsomine was to apply a liquid mixture consisting of two parts of raw linseed oil, three parts of coach japan and one part turpentine. This mixture was flowed freely over the kalsomine and is said to have served to bind it to the surface most securely. The chief drawback to the use of the anti-kalsomine develops in the surfacing of it. In sandpapering it the dust set in motion is fairly suffocating.

After sandpapering the kalsomine the color may be applied directly upon the surface thus provided and the finish brought along in the usual way.

While we would not recommend this treatment for a really first-class job it will nevertheless meet an emergency most successfully.

Another method of filling the fissures is to reduce roughstuff filler to a brushing consistency in shellac, making the first coat thinner than those which follow, as a means of getting better penetration. Three coats of this preparation will for the ordinary run of cases suffice to stop the fissures full. It will be understood that this shellac-roughstuff combination is remarkably quick-acting and must therefore be handled expeditiously.

Another method is to first sandpaper the old surface closely with No. 1 paper, and then apply a coat of stout lead mixed in one part raw linseed oil and three parts turpentine. Permit this coat ample time in which to dry and mature nicely. Then with hard-drying putty fill all deep cavities—all surface disfigurements, in fact. Then sandpaper these blotches down smooth and proceed to draw-putty the surface entire with hard putty let down with turpentine to a consistency that will allow for smooth, clean glazing results. Use a broad French scraping knife, say 2½ or 3 inches wide, half elastic. This work had best be turned over to an experienced body surface maker trained in the use of the glazing knife.

The real secret of getting a good surface from this type of work consists of developing the glazing material very smoothly and without any visible threads of pigment running through the facing-up material. These are due to where the knife overlaps, with the one drawing of the knife being held at a greater pressure than the preceding or the following one.

These threads of pigment sandpaper hard and tough sometimes, and it is well, therefore, to lay due emphasis upon the importance of making the glazing and facing-up strokes of the knife of a uniform pressure. The smoother and evener this glazing stuff can be worked out over the surface the less it will cost to fit it for the color coats and the better surface results will be had.

Another plan for filling up the fissured surface provides for making a filling medium of equal parts, by weight, of English filler, dry white lead and whiting, these to be mixed in equal parts of coach japan and rubbing varnish. To this mass add one-half the quantity of rye flour paste, stirring all into a stiff paste.

Apply to the surface with an old paint brush, and when it has set up somewhat proceed to knife it in with a broad scraping knife. A couple of days after it may be worn down smooth and level with a rubbing brick dipped in equal parts raw linseed oil and turpentine.

Upon badly fissured surfaces this plan may be still further fortified, as it often is, by adding two or three coats of roughstuff, and in due time rubbing down with blocks of brick and water.

The main thing in all this filling-up work is to get the cracks stopped as full as possible at the very outset of the surfacing; then all that comes after serves to give body and bulk to the foundation, thus giving to the varnish coats a full opportunity to hold out and yield a finish of fine body and rich lustre.

Freshly Prepared Pigments Best

It is never wise trade practice to mix and prepare pigments far in advance of actual requirements. The newly thinned color is better and safer than the pigment that has been for some time mixed and allowed to stand on the shelf awaiting use.

Japan ground colors, especially, are subject to acquiring a fatty condition. They lose by evaporation and fail to flow and work under the brush to the same point of perfect condition as when just thinned and made ready for application.

The oil mixed pigment is also a material that thrives best and gives the best surface results when it has not been prepared much in advance of actual requirements.

All materials have a capacity for gathering certain elements from the air, unless kept in air-tight containers, which are detrimental to the fabric when it has dried and matured.

Of course, if it were possible to keep all materials in air-tight containers there would ensue no evaporation and no loss of tissue or molecular fibre, and no slowing down of the flowing and working properties. In such cases, it would be an advantage, many times, to prepare the paint or color in advance of requirements.

It is true that a fine color if mixed and thinned a few hours in advance of actual needs, and allowed to stand to settle and quiet down in a clean place, with a small air exposure, will flow and work out with a richer feel to it and with a more velvety texture than if thinned and used immediately. This may not seem as important as it is here considered, by many readers, but it has at least gained quite a notable following in first-class shops. The writer has long been an advocate of this practice for fine colors. However, it should not be confused with our remarks concerning mixing, for the most part, pigments just prior to using them.

Thinning of Colors

In the thinning of colors, for example, it is always best to add the turpentine gradually, meanwhile working the mixing ladle thoroughly so that there may be a uniform and certain breaking up of the pigment with no unbeaten particles to roll out from under the brush as the pigment goes to the surface.

Color brilliancy and purity of shade depend upon a smooth, compact flow of material; this cannot be had if the color has been unevenly thinned and worked out. The good color is not the one that is the most opaque and dense in its color. The finest black, as an illustration, is the one that while exceedingly transparent, shows the greatest brilliancy and purity of tone. And all these pigments should be comparatively recent in their preparation before the moment of their application.

Due Respect for Varnish

Unless we have respect for an indispensable material we may reckon to a certainty that we shall pay dearly for our varnish supplies. Varnish has been declared to be at once the most delicate and sensitive and yet under certain conditions the most durable and abuse-resisting material known in the vehicle painting business.

Early in its life on the surface of the vehicle it is unusually sensitive and delicately constituted; once it becomes matured and duly hardened, it passes quickly to the list of ably-enduring mediums.

Varnish stands bravely up under extremes of heat and cold, of dry weather and wet, of dusty roads and muddy ones, and of a thousand forms of blighting antagonists, and in more than 75 per cent. of cases it withstands all these things and wears on to a

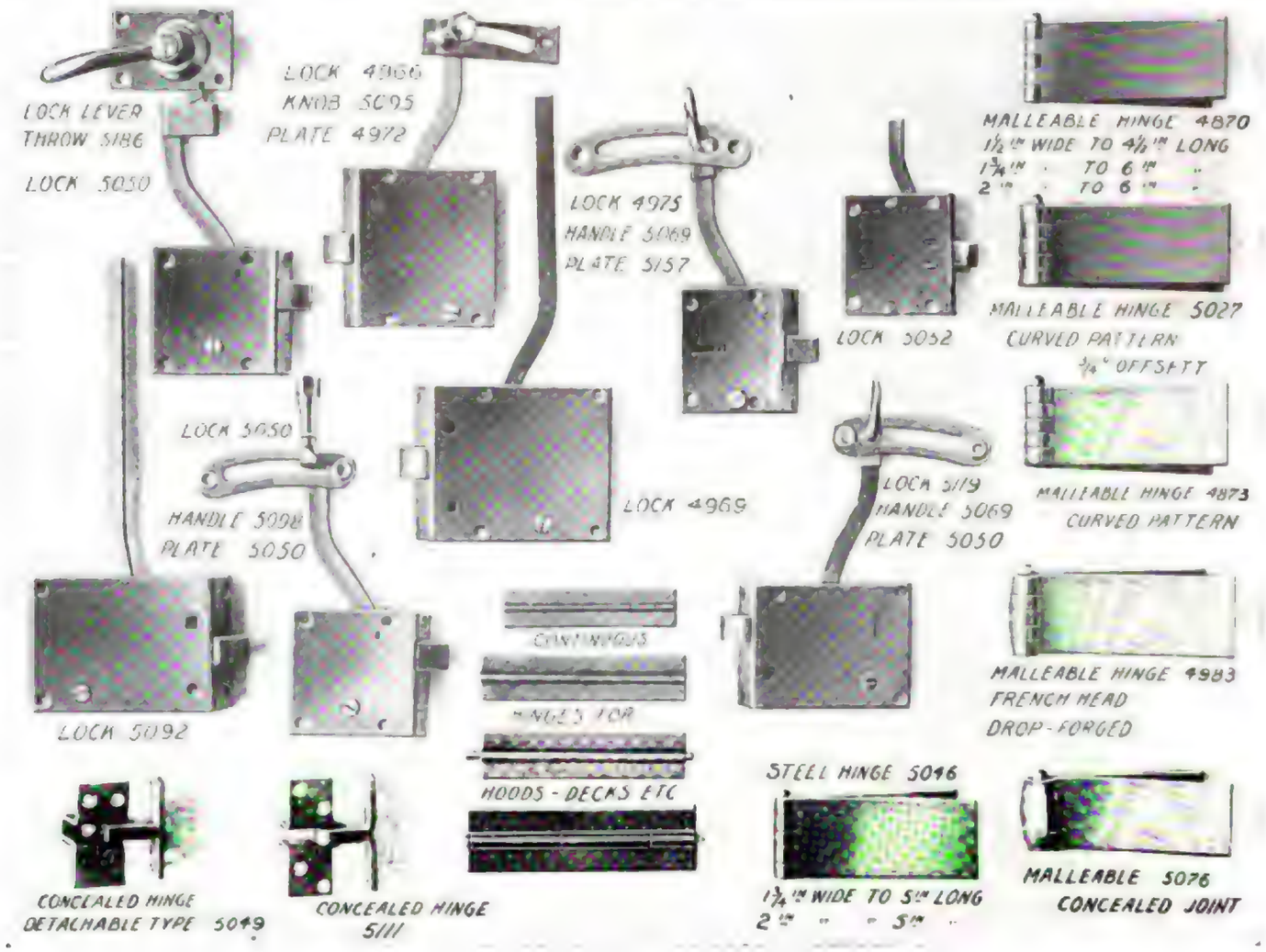
(Continued on page 54)

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SMITH OF DETROIT QUALITY

AUTOMOBILE MOUNTINGS

SMITH OF DETROIT QUALITY



MADE IN DETROIT USA

JOSEPH N. SMITH & COMPANY
DETROIT-MICHIGAN

MADE IN DETROIT USA

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Upholstery, Toppings, Mountings

The Miller Auxiliary Seat

A new style of automobile auxiliary seat which is destined for great popularity is being offered to the trade by Tobias Miller, 1973 West 100th Street, Cleveland, Ohio.

Several thousand of these seats have been sold to a number of high-grade car manufacturers and they seem to be the coming thing in auxiliary seats for the good car. With the Miller seat it is no longer necessary to treat the extra passengers as step-children, as is the case with some of the older types of seats.

The Miller seat is designed to avoid the complicated construction in the floor of the car to receive and hold a seat that is fastened and supported at the front legs only. It also avoids the special arrangement of cross members in relation to the different chassis, which all body builders know is troublesome.

This new seat gives the extra passenger a perfectly comfortable resting place where his body can relax in safety and where he may enjoy the ride and help entertain the party without the discomfort of a twisted spine and a cramp in the leg through the constant tension due to that "unsafe" feeling.

It is claimed by the inventor that the Miller auxiliary seat can be installed in any desired position within a half hour, without injuring or impairing any vital part of the body. Most auxiliary seats as formerly made, more or less affect the design of the body, such as floor cross members, the relation of the sill to the chassis, and particularly affecting the strength of the sill, which is supposed to hold the entire body together.

With the Miller seat there is the possibility of using a deeper upholstery. A cushion as deep as 4½ to 5 inches can be easily utilized. The device is strongly built and there is no probability of its getting out of order. The seat operates by simply tilting it upward and then the opening of the lazy back automatically opens the rear legs. It will bear the heaviest person and cannot collapse under any condition when in use.

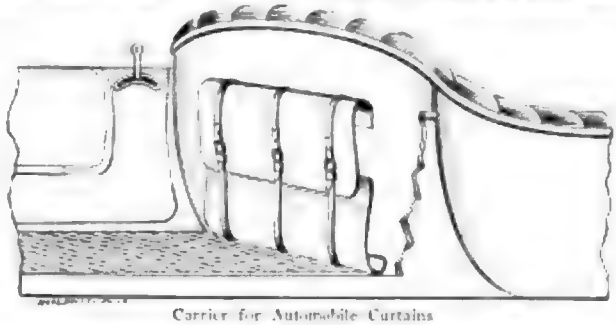
The Miller seat has a pleasing appearance and adds to the looks of the car in which it is placed. Its selling price is not higher than other seats which do not possess the advantages claimed for this invention. Further particulars can be had from Tobias Miller, 1973 West 100th Street, Cleveland, Ohio.

Dodge Brothers Motor Car Co. established a record in the automobile industry when its 400,000th car rolled from the assembling line to the test track for inspection, marking a bona fide delivery of 400,000 cars during the first five years of the company's history.

Curtain Holder

BY C. G. COOK

There are many different curtain holders or carriers for auto curtains when not in use. Some carry them in rolls attached to rear and middle bows, while others carry them in front of top, back of windshield, and in the pockets in the doors. This causes the curtains to be folded many times.



Carrier for Automobile Curtains

This curtain and robe receiver consists of two flaps attached to rear of front seat as shown in drawing. The flaps are pasted out on buckram, using the same material as used in upholstering. The upper flap is stitched to a stick which is screwed to back; the lower flap is tacked to bottom of seat. The three straps with buckles hold the flaps together. This, I think, is a very handy place to carry the curtains, as the occupants of rear seats can get them out without moving from their positions, and the curtains do not fold in so small a package.

Finger Prints and Hide Markings

The criminologist's greatest aid to the police department has been the Bertillon "finger print" and measurement system, thereby making it possible to identify criminals almost infallibly. Inventive sciences, always quick to widen the scope of any discovery or invention, has applied a somewhat similar system to animals with very important industrial results.

As human beings have different finger markings, so animals of different species have distinctive hide markings. These markings are used by manufacturers of leather substitutes for a very important purpose—that of embossing their pyroxylin coated fabrics with the grain of any hide it is desired to imitate.

The embossing plates are made from the genuine hides direct by a modified electroplating process which exactly reproduces every line, pimple and pore of the hides. The plates, either in flat or cylindrical shape, are applied with great pressure to the material to be embossed, with a result so closely approaching leather itself in appearance that only an expert can tell the difference.

In these days of great shortage and record high prices of leather, the real hides must go for the making of shoes, harness and other articles requiring a material that will stand constant bending or flexing, in short, hide leather.

The embossing process, which has made the leather substitute what it is, has been the means of releasing a large amount of leather for such important uses. Some of the fields in which the leather substitute now largely replaces leather are: Upholstery of furniture, automobiles and railway cars; bookbinding; novelty manufacture; traveling goods; sporting goods; shoe trimmings; hat and cap trimmings and kindred uses where the "appearance" of leather is needed on the article rather than the leather itself.

And so, due to our animal Bertillon system, we can buy a beautiful traveling bag, or handsomely bound volume, or luxurious upholstered chair, to all appearances having an outside coating of leather, but in reality a man-made product.

"Old and New Europe"

A calendar for the year 1920, showing a large map of "Old and New Europe," has been issued by John Boyle & Co., Inc., 112-114 Duane Street, New York. The map is correct according to the decisions existing on October 15th, 1919, but is necessarily subject to such changes as may be made subsequent to that date.

John Boyle & Co. are manufacturers of Bayonne black oiled duck, used for automobile and truck tops and curtains, and for wagon tops, side curtains, storm fronts, horse covers, etc. The company also is a large producer of white cotton duck and roofing canvas in all standard widths and weights; also dyed duck, awning stripe and supplies.

With the close of the year 1919 the house of John Boyle & Co., Inc., completed sixty years of an active and honorable career, its business growing in magnitude each year through the addition of new friends, and by retaining the constant good will of old friends. This has been accomplished only by

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fair dealing, and by supplying merchandise of stipulated quality at such prices that buyers are enabled profitably to continually increase their purchases from the company.

With the new political conditions becoming daily more solidly established throughout war-scarred territories, the company looks for a heavy demand in the United States for the products of all the countries with which John Boyle & Co. are in intimate business relations, and they have no doubt that this enlarged commerce will result in renewed and increased world-wide prosperity.

Blocksom & Co's New Plant

The new factory plant of Blocksom & Co., manufacturers of sterilized curled hair, Michigan City, Ind., is virtually completed except for the installation of the boilers and the maple flooring. The plant is expected to be in operation during the early part of January.

The company has 26,500 square feet of floor space, and profiting from their twenty years of experience in the equipment and management of two former curled hair factories, they are filling this space with the most modern machinery, including roller bearing transmission, insuring a maximum of product with a minimum outlay for power.

The new plant is advantageously located on the Harbor canal, with 620 feet of dockage and 600 feet of switch track. The location is in a straight line for Detroit, Jackson, Flint and other Michigan automobile manufacturing centers, via the Michigan Central and Pere Marquette railroads. It is also in direct communication with Kokomo, Indianapolis, Cincinnati, Louisville and other southeastern points, via the Lake Erie and Western, and the Monon lines, with their respective connections.

The company deems its location particularly advantageous, in that they can ship carloads or L.C.L. out of Michigan City with more facility than they could from Chicago with its congested freight terminal and resulting waits of teamsters with their loads of freight at the freight houses. Likewise, it being unnecessary to pass through such a procedure as an outside terminal, such as is necessary at Chicago, means that goods are in the hands of the ultimate carrier with more dispatch than could be accomplished in large cities like New York, Philadelphia and Chicago.

The labor turnover in a small town is necessarily smaller than in the large metropolitan centers because labor is less transitory and less disposed to radical tendencies; which means that the concern will be able to insure a prospective buyer of more constancy as a source of supply.

Popularity of Parsons Hinges

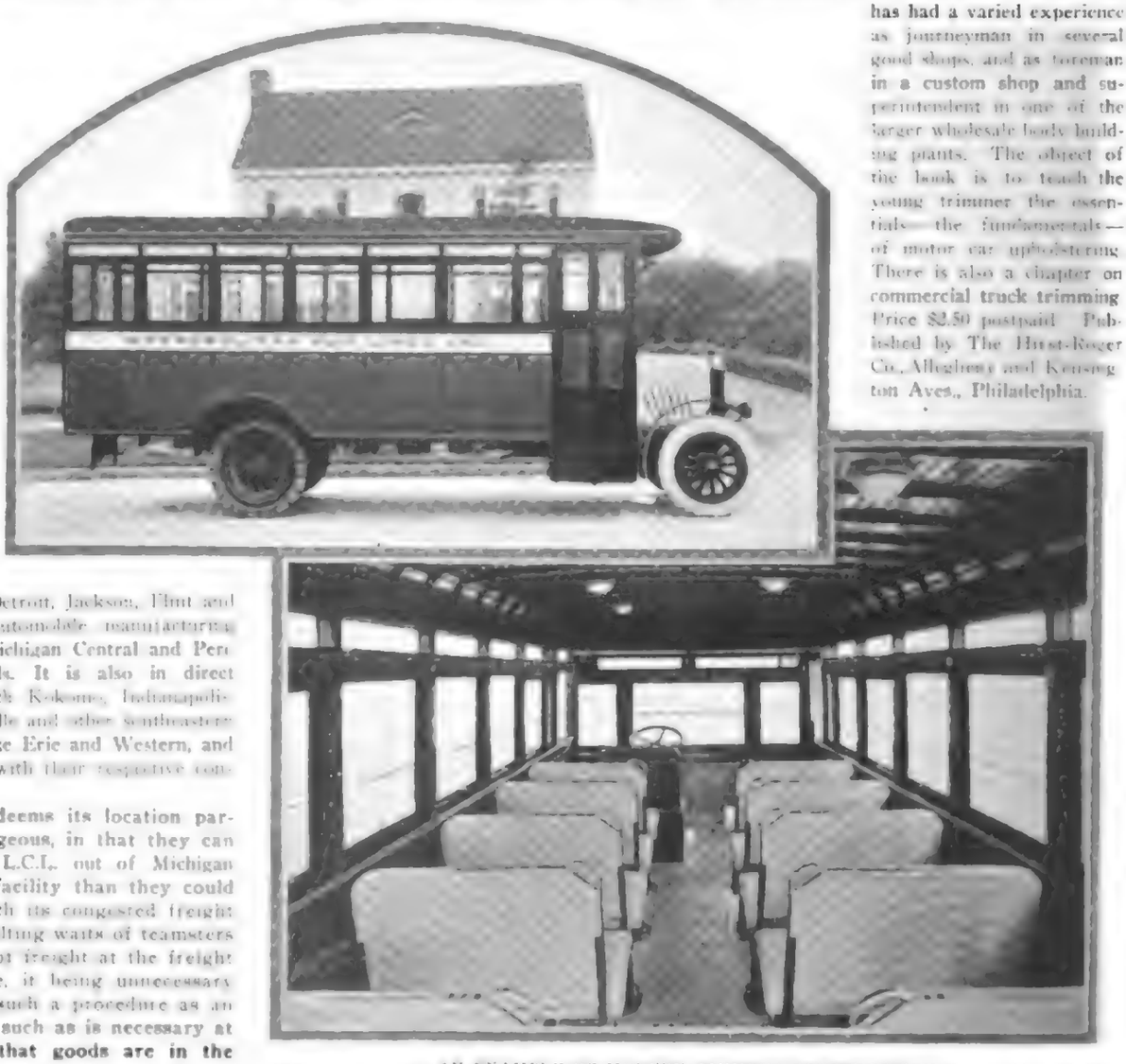
At the New York shows every element that enters into automobile construction will receive the close attention of actual body builders and those who are connected with the industry. Visiting body builders will note, for one thing, that a very large percentage of the bodies will be furnished with hinges made by the Parsons Manufacturing Co., Detroit.

Of the Parsons hinges the largest output is of the No. 39, of which there are approximately five million in use today. During the past year the company has also put on the market a concealed hinge for closed bodies, which are of a very high grade, and used of course in quality cars. The company is manufacturing a great quantity of outside concealed joint curved malleable hinges for the largest automobile makers, and these hinges are all made uniform and interchangeable, which accounts, in part, for their great

The attention of the trade is also called to the Parsons No. 55 coach lock and the No. 472 double action touring car lock. These are high-grade products and well adapted to their respective purposes. In all Parsons products are incorporated the original ideas (co-operating with the body builders' requirements), which have been a feature of the Parsons output.

"Motor Car Upholstering"

"Motor Car Upholstering" is the title of a new book for automobile trimmers and men under instructions in the upholstery departments of automobile factories. The book was prepared by an automobile trimmer who has had a varied experience as journeyman in several good shops, and as foreman in a custom shop and superintendent in one of the larger wholesale body building plants. The object of the book is to teach the young trimmer the essentials—the fundamentals—of motor car upholstering. There is also a chapter on commercial truck trimming. Price $2.50 postpaid. Published by The Hirst-Roger Co., Allegheny and Kensington Aves., Philadelphia.



AN EXAMPLE OF MODERN OMNIBUS CONSTRUCTION.

With a view of the interior. The upholstery is in rattan, and the seats are very much like those used in electric trolley cars. Designed and built by Sullivan Motor Truck Corporation, Rochester, N. Y.

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Moleskin Quality

for the upholstering adds a tone of luxury and refinement to the motor car



O'BANNON MOLESKIN

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Made in a variety of shades and grains, including the popular Spanish finish. *Send for samples.*

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DUXRANE

REG. U.S. PAT. OFF.

SINGLE-TEXTURE TOP-FABRIC

GIVE it the *Scrub Test.* Take a piece of Duxrane in your hand and treat it rough. Scrub it together unmercifully, precisely as a washwoman scrubs clothes. Don't be afraid of injuring the surface, because you can't. Rub it hard, so hard that the surface will become hot, then try to peel off the coating. You will find that it adheres so tenaciously to the fabric that it cannot be peeled. This is the test devised by experts who buy rubberized top fabrics. It is far more severe than any test to which the material could possibly be subjected to in actual use or service. Isn't there a sense of satisfaction to you as a Trimmer to know that the tops you put out will stand up under the most severe use and service and retain a new, snappy appearance? Let us send you a sample of Duxrane to test as we have suggested. Seeing is believing and a test is the final proof of superiority.



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Manufacturers of Leather Substitutes, Rubberized Top Fabrics, Enameled Muslins, Drills and Ducks

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Tendencies in Motor Truck Design

By C. P. Shattuck, M. E.

Opportunity to note the progress made in truck design as well as the lessons taught by the war will be afforded the business man and the student of motor highway transportation by the National Motor Truck Shows at Eighth Coast Artillery Armory, Kingsbridge Road and 194th Street, New York, January 3-10, inclusive, and at the International Amphitheater, Chicago, Jan. 24-31, inclusive. The motor truck exhibitions will be held simultaneously with the passenger car displays, but they will be held in separate buildings. The New York passenger car show will be held in Grand Central Palace, while the Chicago passenger car show will take place in the Coliseum.

Visitors at the truck shows will probably be impressed by the production statements of the manufacturers and no doubt will be surprised to learn that at least four have planned a production of 20,000 trucks each for 1920, and that the total of 80,000 is more than the entire output of the country in 1915. In 1917 the value of the trucks produced was over $220,000,000; in 1918, $434,000,000, and this year exceeds these figures, although there were no war orders. The estimated production for 1920 is 325,000 trucks, including 530-odd models, and this number will be increased, as several new models are being held back for the show.

Statistics of a trade authority show that 38 per cent. of the models will be 1½ and 2-ton capacity trucks, with the 3½-ton third, the 2½-ton fourth, 5-ton fifth and 1-ton sixth. Production figures of the various capacities are not possible at this time. The trend in load capacity, however, shows a pronounced increase in the 1½ and 2½-ton chassis, the latter gaining over 50 per cent., or nearly a 300 per cent. increase since 1915. The 1½-ton chassis models have increased about 30 per cent. There is a slight increase in the number of 3½ and 5-ton models.

Insofar as the trend in mechanical design is concerned the satisfactory service afforded by our trucks abroad and the demand at home has led the manufacturer to concentrate on production, and while a number of interesting refinements in details will be seen at the show no marked departure from standard engineering practice should be anticipated. There are what may be termed mechanical changes, but they are few in number as compared with former years, or before the war taught the world the utility of the motor truck.

As was to be expected, designers of carburetors and engine engineers have given consideration to the heavy fuel problem with the result that effort has been directed toward increasing engine efficiency by the use of either a hot spot manifold and thermostatic or automatic control of the cooling fluid, or both. Use of the heat of the exhaust gasses to break up the particles of fuel and thereby obtain a more homogeneous mixture is favored by many makers. The application of these principles will afford interesting study to those of a mechanical turn of mind.

No change in engine practice other than

Exhibitors of Accessories at National Shows

(Continued from page 14)

NAME	PASSENGER		TRUCK	
M & A. M. A. Office, New York City	N. Y.	Chi.	N. Y.	.....
McCord Mfg. Co., Inc., Detroit, Mich.	N. Y.	Chi.	.....	.....
McQuay-Norris Mfg. Co., St. Louis, Mo.	N. Y.	Chi.	.....	.....
Macbeth-Evans Glass Co., Pittsburgh, Pa.	N. Y.	Chi.	.....	.....
Manley Mfg. Co., York, Pa.	N. Y.	Chi.	.....	.....
Marlin Rockwell Corporation, New Haven, Conn.	N. Y.	Chi.	.....	.....
Martin, James, New York City	N. Y.	.....	.....	.....
Mead-Morrison Mfg. Co., East Boston, Mass.	.....	.....	N. Y.	Chi.
Merchant & Evans Co., Philadelphia	.....	.....	N. Y.	Chi.
Merritt Co., S. W., New York City	N. Y.	.....	.....	.....
Metal Stamping Co., Long Island City, N. Y.	N. Y.	Chi.	.....	.....
Midwest Engine Co., Indianapolis, Ind.	N. Y.	.....	.....	.....
Militor Corporation, Springfield, Mass.	N. Y.	Chi.	.....	.....
Miller, Chas E., New York City	N. Y.	.....	.....	.....
Morse Chain Co., Ithaca, N. Y.	N. Y.	Chi.	.....	.....
Moto-Meter Co., Long Island City, N. Y.	N. Y.	Chi.	.....	.....
Motor Car Supplies Co., Inc., New York	N. Y.	.....	.....	.....
Motor Compressor Co., Newark, N. J.	.....	.....	N. Y.	.....
Motor Guide, New York	N. Y.	Chi.	.....	.....
Motor Kleen Co., New York City	N. Y.	.....	.....	.....
Motor Spark Plug Co., Newark, N. J.	N. Y.	.....	.....	.....
Motor Vehicle Publishing Co., New York City	N. Y.	Chi.	.....	.....
Mutty Co., L. J., Boston, Mass.	N. Y.	.....	.....	.....
Muzzy-Lyon Co., Ltd., Detroit, Mich.	N. Y.	.....	.....	.....
Nathan Novelty Mfg. Co., New York City	N. Y.	.....	.....	.....
National Carbon Co., Cleveland, Ohio	N. Y.	Chi.	.....	.....
National Clutch Co., Inc., Irvington, N. Y.	N. Y.	Chi.	.....	.....
National Tube Co., Pittsburgh, Pa.	N. Y.	Chi.	.....	.....
National Wire Wheel Works, Inc., Detroit, Mich.	N. Y.	Chi.	.....	.....
New Era Spring Specialty Co., Grand Rapids, Mich.	N. Y.	.....	.....	.....
New York Coil Co., New York City	N. Y.	Chi.	.....	.....
Nobrac Co., New York City	N. Y.	.....	.....	.....
Northwestern Chemical Co., Marietta, Ohio	N. Y.	Chi.	.....	.....
Oakes Co., Indianapolis, Ind.	.....	Chi.	.....	.....
Pantasote Co., New York City	N. Y.	Chi.	N. Y.	Chi.
Parker Axle & Prod. Corp., New York City	.....	.....	N. Y.	Chi.
Parry Mfg. Co., Indianapolis, Ind.	N. Y.	Chi.	N. Y.	Chi.
Perfection Heater & Mfg. Co., Cleveland, Ohio	N. Y.	Chi.	.....	.....
Perkins Tonneau Windshield Co., New York City	N. Y.	.....	.....	.....
Phelps Mfg. Co., Columbus, Ohio	N. Y.	Chi.	.....	.....
Pines Mfg. Co., Chicago	N. Y.	Chi.	.....	.....
Power Farming Press, St. Joseph, Mich.	.....	.....	N. Y.	.....
Powrlok Co., Cleveland, Ohio	N. Y.	Chi.	.....	.....
Pratt Mfg. Co., Wm. E., Chicago	N. Y.	Chi	.....	.....
Presto Felt Mfg. Co., Inc., Toledo, Ohio	.....	Chi.	.....	.....
Prest-o-Lite Co., New York City	N. Y.	Chi.	.....	.....
Primolite Sales Co., Westfield, N. Y.	N. Y.	Chi	.....	.....
Radcliffe Turbin-Drive Co., Inc., New York City	N. Y.	Chi.	.....	.....
Rajah Auto Supply Co., Bloomfield, N. J.	N. Y.	Chi	.....	.....
Recording & Computing Machine Co., Dayton, Ohio	N. Y.	.....	.....	.....
Reliance Wheel Co., Youngstown, Ohio	N. Y.	.....	.....	.....
Republic Auto Parts Co., L. I. City, N. Y.	N. Y.	Chi	.....	.....
Rex Mfg. Co., Connersville, Ind.	N. Y.	Chi.	.....	.....
Rich Mfg. Co., New York City	N. Y.	.....	.....	.....
Rives Mfg. Co., Geo. H., New York City	N. Y.	.....	.....	.....
Robertson Cradlelock Wheel Co., Chicago	.....	.....	N. Y.	.....
Rockwell Mfg. Co., College Point, L. I.	N. Y.	Chi.	.....	.....
Russel Motor Axle Co., Detroit, Mich.	.....	.....	N. Y.	Chi.
Saltsman, Co., DeWitt G., New Haven, Conn.	N. Y.	.....	.....	.....
Schrader's Son, A., Inc., Brooklyn, N. Y.	N. Y.	Chi.	N. Y.	Chi.
Schulte Body Co., Charles; Lancaster, Pa.	N. Y.	.....	.....	.....
Sears-Cross Co., Brooklyn, N. Y.	N. Y.	Chi.	.....	.....
Security Auto Theft System, New York City	N. Y.	.....	.....	.....
Sedgwick Sales Co., Bronx, New York City	N. Y.	.....	.....	.....
Sewell Cushion Wheel Co., Detroit, Mich.	.....	.....	N. Y.	Chi
Shaler Co., C. A., Waupon, Wis.	N. Y.	Chi.	.....	.....
Shontz, Co., H. B., Inc., New York	N. Y.	.....	.....	.....
Silvex Company, Bethlehem, Pa.	N. Y.	.....	.....	.....
Simms Magneto Co., East Orange, N. J.	N. Y.	Chi.	.....	.....
Sparks-Withington Co., Jackson, Mich.	N. Y.	Chi.	.....	.....
Special Tool Engineering Co., Dayton, Ohio	N. Y.	Chi	.....	.....
Spencer Metal Products Co., Spencer, Ohio	N. Y.	Chi	.....	.....
Spiro Mfg. Co., C., New York City	N. Y.	.....	.....	.....
Splitdorf Electrical Co., Newark, N. J.	N. Y.	Chi.	N. Y.	Chi
Standard Steel Castings Co., Cleveland, Ohio	.....	.....	N. Y.	Chi.
Standard Tool & Engineering Co., South Bend, Ind.	.....	Chi.	.....	.....
Stanley Co., John T., Inc., New York City	N. Y.	.....	.....	.....
Stewart Mfg. Co., F. W., Chicago	N. Y.	.....	.....	.....
Stewart-Warner Speedometer Corporation, Chicago	N. Y.	Chi.	.....	.....

(Continued on page 46)

obtaining better thermal efficiency is to be expected in these days of production. In the matter of fuel supply there appears to be an increasing use of the vacuum feed, but gravity continues to be used on approximately 80 per cent. of the models.

There is a slight gain in the use of battery ignition, which is to be expected, but as heretofore it appears on the smaller capacity trucks which are generally equipped with electric lighting and starting. Approximately 97 per cent. of the models are magneto equipped, and with very few exceptions the ignition is single and a manual control is employed.

Relative to the battery ignition equipped trucks, 31 per cent. of these are 1,500 pounds capacity and less; 16 per cent. 1-ton, and 37 per cent. 1½-tons.

The use of electrical equipment has increased slightly on all trucks, starting, lighting and signals. Fifty per cent. of the trucks of 1,500 pounds capacity and less have electrical equipment as standard and about 22 per cent. of the 1½-ton. The use of starters or electric lighting is slightly increasing on the 4 and 5-ton models and a number of makers give option of starting and lighting.

In the matter of horsepower ratings the average h.p. (S.A.E.) rating of trucks of 1,500 pounds capacity and under is 15.04 against 16.92, there being a slight decrease in the bore. The average h.p. of the 1-ton models is 19.61 against 22.50. That of the 1½-ton remains practically the same, as do the 2, 3½ and 5, but there is an increase in the average h.p. of the 2-ton, it being 27.20 against 25.60.

Dealing with methods of circulating the cooling fluid it will be found that about 60 per cent. of the models of 1½ ton and under have the thermo syphon, and that 45 per cent. of the 1½ ton trucks are thus equipped. The pump method leads, however, being practically universal on the larger capacity trucks. The cellular type of radiator is employed on the lighter types, with the fin on the larger, and the use of cast cases predominates where the fin core is used. The use of a type of radiator facilitating the replacement of damaged tubes or sections as well as permitting of operating the truck by stopping circulation from a damaged section, is a feature of the improvements in cooling methods. Governors controlling engine speed are increasing in favor, about 75 per cent. of the models being thus equipped. Their use is noticed on the larger capacity chassis but 25 per cent. of 1,500 pounds capacity trucks now fit governors as standard equipment.

As to clutches, the dry disc or plate type predominates. There has been a gain of the amidship location of the gearset or transmission, it now leading by a few models the unit or motor type. The number of makers favoring the four speed gearset is also increasing and one manufacturer will display a chassis affording ten speeds, eight forward and two reverse.

Use of the rear springs for taking the drive and torque again predominates, and a few have increased the lengths and widths of springs, although this is an exception. Better attention is being paid to the matter of lubricating shackles, etc., of the spring assembly and one truck at least will show an automatic oiling system. The driver at the left, with center control, is practically universal. Opinion differs as to the frame, the flexible, semi-flexible and rigid types being about equally divided.

If wheelbase lengths be analyzed it will be found that some changes have taken place. This is true of the 1,000 pounds capacity chassis, the average wheelbase of which is now 112 inches against 119 for the previous year. If the smaller chassis have decreased wheelbase the 1½-ton has been lengthened, it now being 126 against 117 inches, average. The average wheelbase of the 1, 1½, and 3-ton show a loss of one inch for the first two and three inches for the last. An increase of 3 inches is noticeable on the 2 and 2½-tons and 2 on the 3½ and 5-ton chassis. Use of larger brakes will be noticeable.

Although the use of the large pneumatic tires is rapidly increasing only about seven per cent. of the models announced at the time this article was prepared have the big pneumatic as standard equipment. About 9 per cent. use pneumatics on the front wheels. Pneumatics have always been favored by makers of the 1,500 pounds chassis and less and are now being fitted on the 1, 1½, 1½, 2 and 3-ton trucks. A few larger capacity chassis will be seen at the show and as was the case last year, there will be even 5-ton trucks displayed with pneumatics. With the trend towards the big shoes is the fitting of the chassis with a power-driven pump and some makers not supplying a pump as standard equipment make provisions for a power take-off for a pump.

Last, but not least, is the wide variety of bodies to be seen. The body manufacturer has kept pace with the truck maker in this respect and offers designs to meet the needs of every industry as well as individual

Exhibitors of Accessories at National Shows

(Concluded from page 45)

NAME	PASSENGER	TRUCK		
Story Rubber Corporation, New York City	N. Y.	.....	.....	.....
Stromberg Motor Devices Co., Chicago, Ill.	N. Y.	Chi.	N. Y.	Chi.
Sunderman Corporation, Newburgh, N. Y.	N. Y.	Chi.	.....	.....
Superior Lamp Mfg. Co., Inc., New York City	N. Y.	.....	.....	.....
Texas Company, New York City	N. Y.	Chi.	.....	.....
Thomas, C. B., New York City	N. Y.	.....	.....	.....
Titeflex Metal Hose Corporation, Newark, N. J.	N. Y.	.....	.....	.....
Tonneau Shield Co., Inc., New York City	N. Y.	Chi.	.....	.....
Torbenson Axle Co., Cleveland, Ohio	.....	.....	N. Y.	Chi.
Trexler Co., Philadelphia, Pa.	N. Y.	Chi.	.....	.....
Triplex Safety Glass Corporation, New York City	N. Y.	Chi.	.....	.....
Triplex Tire Corporation, New York City	N. Y.	.....	.....	.....
Tuthill Spring Co., Chicago	.....	Chi.	.....	.....
Twin Fire Spark Plug Co., Detroit, Mich.	.....	Chi.	.....	.....
United Mfg. & Distributing Co., Chicago	N. Y.	Chi.	.....	.....
United States Air Compressor Co., Cleveland, Ohio	N. Y.	.....	.....	.....
U. S. Light & Heat Corporation, Niagara Falls, N. Y.	N. Y.	Chi.	.....	.....
Unity Laprobe Mfg. Co., Inc., New York City	N. Y.	.....	.....	.....
Universal Shock Eliminator, Inc., New York City	N. Y.	Chi.	.....	.....
Utilities Sales Corporation, Philadelphia	N. Y.	Chi.	.....	
Vacuum Oil Co., New York City	N. Y.	Chi.	N. Y.	.....
Van Sielern Speedometer Co., Elgin, Ill.	N. Y.	Chi.	.....	.....
Vaporizer Utilities Sales Corporation, New York City	N. Y.	Chi.	N. Y.	Chi.
Veeder Mfg. Co., Hartford, Conn.	N. Y.	Chi.	.....	.....
Wales-Adamson Co., Chicago, Ill.	.....	Chi.	.....	.....
Wallace Mfg. Co., Newark, N. J.	N. Y.	.....	.....	.....
Waltham Watch Co., Waltham, Mass.	N. Y.	Chi.	.....	.....
Warner-Patterson Co., Chicago, Ill.	N. Y.	Chi.	.....	.....
Wasson Piston Ring Co., Plainfield, N. J.	N. Y.	.....	.....	.....
Waukesha Motor Co., Waukesha, Wis.	.....	.....	.....	Chi.
Weaver Mfg. Co., Springfield, Ill.	N. Y.	Chi.	.....	.....
Wellman-Seaver-Morgan Co., Akron, Ohio	.....	.....	N. Y.	Chi.
West Steel Casting Co., Cleveland, Ohio	.....	.....	N. Y.	Chi.
Weston Electrical Inst. Co., Newark, N. J.	N. Y.	.....	.....	.....
Wheeler-Schebler Carburetor Co., Indianapolis, Ind.	N. Y.	Chi.	N. Y.	Chi.
Whittington Mfg. Co., Montrose, Pa.	N. Y.	.....	.....	.....
Wildenberg Bros., New York City	N. Y.	.....	.....	.....
Willard Storage Battery Co., Cleveland, Ohio	N. Y.	Chi.	.....	.....
Williams Co., J. H., Brooklyn, N. Y.	N. Y.	Chi.	.....	.....
Wilson, K. R., Buffalo, N. Y.	N. Y.	Chi.	.....	.....
Wire Wheel Corporation of America, Buffalo, N. Y.	N. Y.	Chi.	.....	.....
Woodworth Mfg. Corporation, Niagara Falls, N. Y.	.....	Chi.	.....	.....
World Mfg. Co., Richmond Hill, N. Y.	N. Y.	.....	.....	.....
"X" Laboratories, New York City	N. Y.	Chi.	.....	.....
Yale & Towne Mfg. Co., Stamford, Conn.	N. Y.	Chi.	.....	.....
Zenith Carburetor Co., Detroit, Mich.	N. Y.	Chi.	.....	.....

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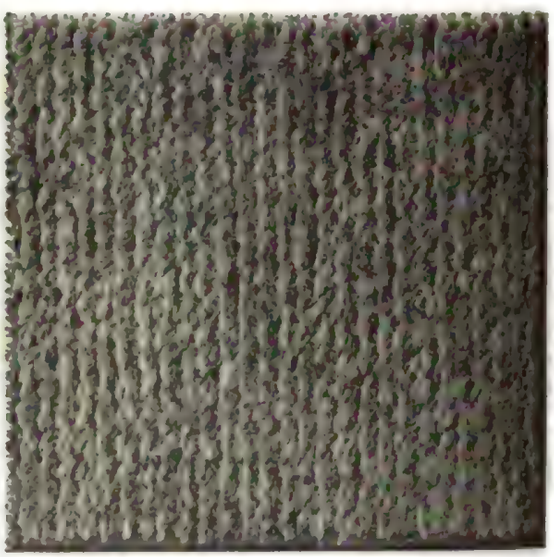
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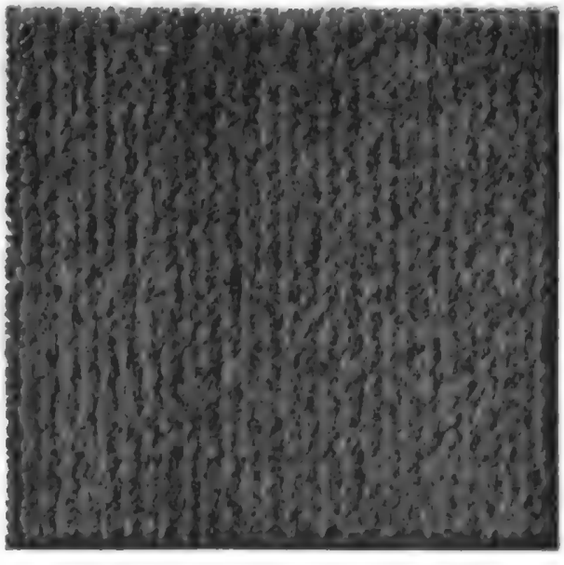
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News in the Trade

Our Cincinnati News Letter

Cincinnati Business Conditions

The carriage factories in Cincinnati have sufficient business on hand to keep them going for many months and orders are anything but scarce with them. The old story of procuring material is still in vogue and it is very difficult at times to get the necessary goods used in building a buggy. Consequently there is nothing to do but to keep after the mills and endeavor to have them rush production as much as possible.

* * *

The steel and coal situation is now very much relieved and from all reports a number of the steel mills are running to normal capacity, and relief for the carriage maker seems to be in sight.

* * *

On November 20th, the first annual convention of the sales force of the new South Central District of The Sherwin-Williams Company took place. Representatives from eight States controlled by the Cincinnati office of this progressive concern were present. Trade discussions and many other important matters were taken up. A banquet followed in the evening at the Business Men's Club.

* * *

Cincinnati Has Farm Products Show

The Tri-State Farm Products Show opened in Music Hall on Saturday, November 29th and closed on Saturday December 6th. The show was a decided success from start to finish. Exhibitors from Ohio, Indiana and Kentucky had displays of fruits, vegetables and garden products. The exposition was a combination of the annual county and tri-county shows and had the co-operation of the various agricultural colleges, the Hamilton County Farm Bureau and the Cincinnati Chamber of Commerce.

* * *

Motor Truck Parade

A grand truck parade with several hundred of the various makes of trucks taking part, was given on Monday, December 8th. Some of the trucks were loaded with freight and made trips within a radius of 75 miles from Cincinnati, returning the same day. This parade was one of the many movements on the part of the truck manufacturers to "Ship by Truck."

* * *

Carriage Builders' Christmas Dinner

The Christmas dinner of the Cincinnati Carriage Makers' Club took place on the evening of December 17th at the Hotel Gibson. The dinner was followed by a dance and the members and their ladies all had a most royal time. Chairman P. P. Hunter, of the entertainment committee, issued invitations in the form of a court summons, apprising the recipient that he or she must appear on the evening of December 17th at the "Gibson Court" and testify and give reasons why the Cincinnati Carriage Makers' Club should be deprived of the honor of their company.

* * *

Max Danzinger, secretary of the United States Varnish Co., has just returned from a western and southern trip and reports business as being very good. Mr. Danzinger hastened his trip in order to attend the Christmas dinner of the Carriage Makers' Club.

* * *

General Pershing's Visit

On December 15th Cincinnati was honored with a visit by that most distinguished American and soldier, General John J. Pershing. The General and staff arrived in Cincinnati from Louisville, Ky., at 4.45 P. M., and after a reception at the Hotel Sinton a banquet in his honor followed at the Business Men's Club. Later the same evening the General and staff boarded a train for Dayton, Ohio.

* * *

Meeting of Carriage Manufacturers

On December 17th a meeting of the carriage manufacturers of the United States was held at the Hotel Gibson. Several hundred carriage makers of the country were present on that day, as matters of vital importance were taken up. On behalf of the Carriage Makers' Club of Cincinnati, President Clen Perrine issued invitations to the visitors to attend the Christmas dinner on that same evening at the Hotel Gibson.

* * *

Lambert D. Lutz Passes Away

Lambert D. Lutz, representing The Eberhard Mfg. Co., Cleveland, in this district, passed away suddenly at his residence in Wyoming, near Cincinnati, on the evening of November 30th. Mr. Lutz enjoyed the confidence of everyone he came in contact with and numbered his friends by the hundreds. His untimely death was a shock and a severe loss to the entire community. His genial manner and many sterling qualities endeared him to all. He leaves his widow and son Nixon to mourn his loss. The funeral took place on December 3d, and his remains were placed in a vault in the Spring Grove cemetery.

Alexander Now With Hildreth Varnish Co.

W. J. R. Alexander, one of the most popular and successful representatives in Cincinnati and former secretary of the Cincinnati Carriage Makers' Club, and for several years representing the Beckwith-Chandler Co., has severed his connections with that company, and after January 1st will represent The Hildreth Varnish Co. of New York. Mr. Alexander's territory consists of southern Ohio, Indiana and Kentucky. He has the congratulations and best wishes of hosts of friends who bespeak for him unbounded success, which he surely deserves. Mr. Alexander will retain his present quarters at 111 East Fourth Street, Cincinnati.

Splendid Opportunity for Body Builders

The owner of a well-located vehicle factory has reached an age when he feels the desirability of retiring from active life. His decision to do so creates an opportunity that is seldom offered for someone else to step into an established business with a good name behind it.

The plant has a complete body department and a modern smith shop, and is well adapted to automobile work. The buildings are electrically lighted throughout and have a power plant and abundant water supply. Two elevators connect the different floors. The tract of ground is 500 feet front and 126 feet in depth.

The plant is located in Pennsylvania, 55 miles from Philadelphia; 15 miles from Lancaster; 40 miles from Harrisburg, and 60 miles from Baltimore. With such proximity to several important motor car markets, and within reach of a population of several millions of city and country people, it would be hard to find a better location for anyone about to embark in the motor body business. Complete information, terms, etc., can be had by addressing "Q. C. W.," care The Vehicle Monthly, Philadelphia.

Mulholland Bodies at the Show

The Truck Body Corporation, New York City, has reserved a space at the New York truck show, January 3 to 10, where they will display the Mulholland standardized truck body units, made by The Mulholland Company, Dunkirk, N. Y. This is something new in the body end of the truck business and the display will be educational to everyone interested in motor truck body construction.

V. Lowener's New York office, 114 Liberty Street, New York, will be pleased to receive catalogues and price lists for all kinds of automobile accessories and supplies for export to Scandinavia.

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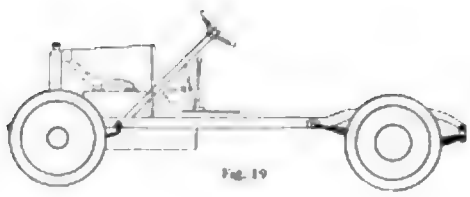


Fig. 19

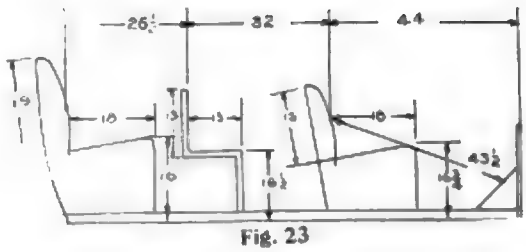


Fig. 23

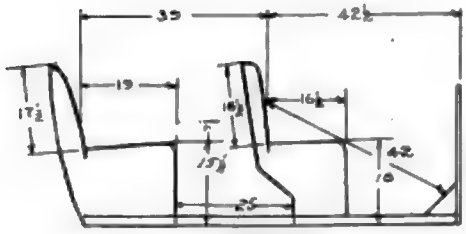


Fig. 20

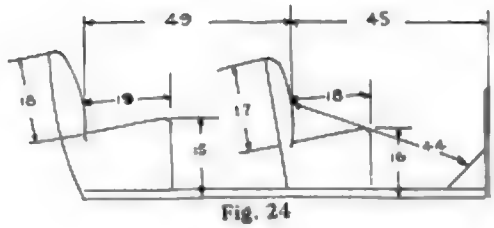


Fig. 24

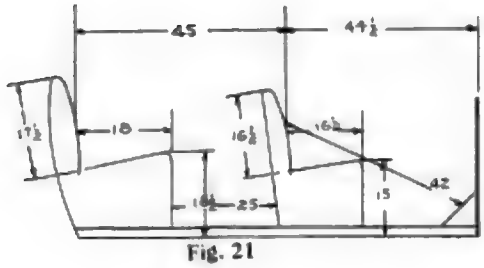


Fig. 21

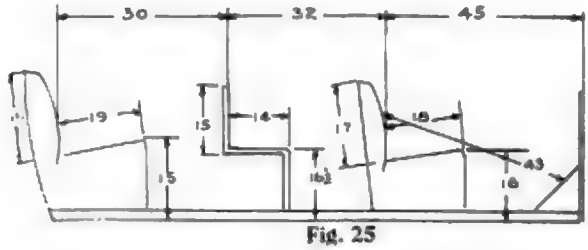


Fig. 25

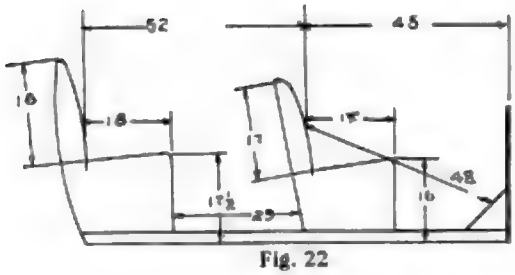


Fig. 22

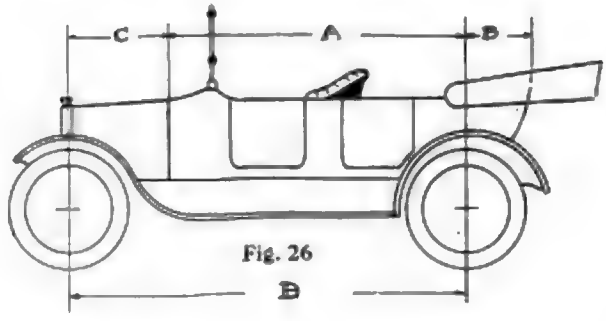


Fig. 26

Principles of Body Designing

(Continued from page 29)

ence being caused by the four-cylinder car being kept as small as possible while the twelve is made as large as possible, which accounts for the great difference of 19 inches. A good average dimension for A would be 86 inches, and would apply on a moderate wheelbase or either four or six-cylinder cars.

The seat and leg room having been considered, the width of the body that can be obtained will be defined. The front seats on touring cars and roadsters are generally constructed to accommodate two passengers, and have a width of 40 inches. The modern body lines tend to make the front seat wider, and so the seat width may run more around 42 inches. In the roadster the front seats are made even wider, so that three people can get in it when necessary. The rear seat on a touring car is generally made to take three people, and to do this comfortably as much space as possible is provided in it. The available space is limited by the distance between the rear wheels.

The standard track width for American cars is 56 inches, that is, the distance between the centers of the wheels. In the diagram, Fig 28, the rear end of the body is shown and also its relation between the rear wheels. It is seen that depressions have to be made in the sides of the body to clear the wheels. These depressions are called "wheelhouses" and have to be made about 48 inches wide. If the wheelhouse is 48 inches and 2 inches are allowed for clearance on each wheel it equals 52 inches. The tire diameter being 4 inches, this will equal 2 inches on each side, making 2 + 2 + 52 = 56. Now, if the wheelhouse is 48 inches, the best width possible is between 46 and 47 inches. This only allows from ½ inch to 2 inches on each side for trimming. If the cushion is raised above the wheelhouse, it makes a very ungraceful looking seat, which is not satisfactory with the present style of bodies. Then again, the cushions will have to have the extensions running out and these would not be deep enough to give riding comfort. A depth

(Continued on page 56)

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The Motor Vehicle Market in China

[Consul C. K. Gauss, Amoy, China, Sept. 4, 1919]

There are at this time no motor vehicles in use in the Amoy consular district, for the reason that there are no roads in the entire district capable of carrying motor or wheeled traffic. Several projects are on foot for the construction of motor roads, such a measure being believed to be the solution of the passenger traffic problems of the district. Amoy is an emigration port and the passenger traffic between it and coast and interior places is particularly heavy. Present conveniences, including launch service and small boats on shallow streams, are unsatisfactory.

Possible Market for Motor Busses in Amoy

While these motor-road projects have been under discussion for some years, no actual road construction has materialized, although recently some effort is being made to begin actual construction on two roads—one from Anhai, north of Amoy, north to Chuanchow, and another from Shihma (Chioh-be), the head of launch service from Amay, to Changchow. Inquiries have repeatedly been made at this consulate for particulars and prices of motor busses suitable for service on these roads.

It is suggested that if American manufacturers of motor trucks and busses will file their catalogues, and particularly plans and specifications of trucks with passenger bodies, with this consulate, and state the names of their China and Manila agents (particularly the latter, since the local Chinese repeatedly make inquiry for information from Manila, and Manila has direct steamship connection with Amoy), it is possible that at the proper time the consulate may be able to interest those in charge of these projects in obtaining American motor vehicles.

The Chinese have not available the technical information as to the most desirable passenger bodies of the passenger and baggage carrying capacity of trucks. The advantage will undoubtedly lie with the manufacturer who supplies information showing passenger bodies which can be either supplied or built locally, with data as to the number of passengers that can be accommodated by each type of bus.

It is greatly to be feared that the type of motor road which is proposed for this district will not be a substantial road, on correct engineering principles. Notwithstanding efforts made to that end, it has not yet been possible to interest the Chinese promoters of projects in proper road-making machinery.

It is believed that the lighter type of American passenger-carrying truck or bus will be most likely to find approval.

[Vice Consul Andrew J. Brewer, Changsha, Sept. 4, 1919]

No Motor Roads in Hunan Province

Nowhere in the Changsha consular district is there a single motor car in use. Indeed, with the exception of one stretch of military road which runs along the north and east walls of the city of Changsha, and does not exceed five or six miles in length, nowhere in Hunan Province are there any roads on which motor vehicles could possibly be used. This state of affairs of course demands the construction of roads as a preliminary to the development of any motor-car industry, and with the present disturbed conditions existing generally throughout China, and especially in this Province because of the fighting which occurred in it last year, such construction need not be anticipated for many years.

[Consul Lester Maynard, Chefoo, Aug. 29, 1919]

One Automobile in Chefoo

Due to a total absence of country roads there are no motor vehicles at present in use in the Chefoo consular district.

In one section of the city of Chefoo, which is under joint foreign and Chinese control as far as roads are concerned, it is possible to use small and narrow runabouts; but as distances are not great in the section in question and as the streets in the purely Chinese sections of the city are narrow, crooked and ill-paved, with many obstructions, they are wholly unsuitable for automobiles of any description and can not even be used by motor cycles. One small runabout is occasionally used in the foreign section of the city. Formerly there were two, but the owner of the other considered the use of the machine impracticable and it was sold and shipped to Shanghai.

Probable Purchase of Fifty Trucks in Lungkow

Some years ago a local Chinese company was formed at Lungkow with the purpose of improving the road to the prosperous city of Hwanghsien, which lies in the center of a rich agricultural district, with a view to maintaining an automobile passenger service. Two American cars were purchased in Dairen as a start, but due to local disagreement the road repair work was never undertaken and the automobiles, which were never used, are today standing in a shed in Lungkow.

As the plan for railway communication between Weihsien, on the Shantung railway, and Lungkow and Chefoo now seems indefinitely postponed the Lungkow Development Co. of Lungkow is considering a plan to purchase 50 motor trucks with a view to hauling the vast quantities of export products to Lungkow for ocean shipment.

[Consul W. Roderick Dorsey, Shanghai, Sept. 11, 1919]

Use of Motor Vehicles Increasing in Shanghai

The number of motor vehicles in use in the consular district of Shanghai (international and French settlements) on June 30, 1919, was as follows: Passenger cars, public and private, 1,799; commercial vehicles (trucks, delivery wagons, etc.), 45; cycles, 186; making a total of 2,030. The totals for the years 1916, 1917 and 1918, were 1,002, 1,373, and 1,728, respectively. It is estimated that there are about 350 public passenger cars operating in the two settlements. It will be seen that the use of motor vehicles is increasing rapidly in this settlement; American cars practically monopolize the field at the present time and are very popular, particularly among wealthy Chinese.

There are about 75 miles of road suitable for motor traffic in and near Shanghai, including the recently constructed highway to Woosung.

[Consul General P. S. Heintzleman, Tientsin, Aug 29, 1919]

Number and Kind of Cars in Tientsin District

The Tientsin consular district comprises the northeastern portion of China, including the Provinces of Chihli and Shansi, the northern portion of Honan, and all of eastern Mongolia. The population is estimated at about 50,000,000. The district includes Peking, the capital of China, and Tientsin, each with a population of about a million. Commerce and agriculture are the leading industries. There are about 3,000 foreign residents in Tientsin and Peking, not including military contingents. Japanese residents number approximately 6,000. There are probably 250 foreigners and approximately 20,000 Chinese in Tientsin and Peking who have sufficient incomes to permit of their buying and maintaining motor cars.

The number of motor vehicles in use in this district is estimated at 1,000; nearly all are of American manufacture. The number of motor trucks, practically all of less than two tons' capacity, is about 30; recently several 3 and 5 ton trucks have been imported for passenger transportation in Peking; all the trucks are of American make. There are practically no electric cars in use and no demand for them. No taxicab service exists, but a few concerns in Tientsin and Peking have automobiles for hire.

Four-cylinder, 5-passenger and 6-passenger cars of cheap and medium price are in most general use. There are a number of 6-cylinder cars also, and the demand for these is growing. Little consideration is given to the matter of ratio of gears, due to the fact that the country is flat with no steep grades or hills. Chinese buyers prefer the limousine body, while foreigners, owing to climatic conditions, prefer the touring or sedan body.

Retail Prices—Capacity of the Market

The cars most largely sold retail at 1,000 and 2,000 taels ($1,300 and $2,600 United States currency), though a few higher-priced cars are sold to wealthy Chinese and foreigners. The bulk of the demand in the past has been for low-priced cars, but an increasing number of Chinese and foreign buyers are now demanding a car of modern electrical equipment, quality, etc. No particular conditions exist that would exclude any kind, grade, or price of machine from this market.

Dealers estimate that 200 low-priced, 300 medium-priced, and 100 high-priced cars can be sold in this district in 1919, and the demand in future should be in this proportion.

The use of automobiles is restricted naturally to the extent of improved roads. The roads in Tientsin and surrounding country suitable for motor vehicles aggregate about

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30 miles, while Peking and environs have approximately 130 miles of good streets and roadways.

There are no automobiles manufactured in this district.

Imports of Motor Vehicles and Parts

According to the returns of the maritime customs, 35 motor cars valued at $39,285 were imported into Tientsin in 1916; 164 cars valued at $172,217 in 1917; and 344 cars valued at $410,777 in 1918. The values of motor-car parts imported into Tientsin during these three years was $175,635, and $63,295, respectively.

Customs Duties, License Fees, Fuel Prices

The tariff rates on automobiles and automobile parts are 5 per cent. *ad valorem*.

There are no special requirements as to the licensing of automobiles. The annual fees for each motor vehicle in Tientsin, covering the various concessions and native city, amount to $100 Mexican, equivalent to $93 gold at the present rate of exchange. The annual fees in Peking are $48 Peking Bank of Communications notes, equivalent to $30 gold. Fees are not based on horsepower but are levied by a straight tax irrespective of the size of the vehicle.

Gasoline is mostly used as motive power and sells at $0.95 to $1.05 Mexican per gallon, averaging $0.97 gold.

Terms and Distribution Methods

Three American, two British, and one Belgian firm in Tientsin, and three firms in Peking deal in automobiles. These concerns act as agents of the manufacturers, and their territory covers all of North China. Sales are usually and preferably made through direct representation; the commissions usually charged and the terms of sale and discount allowed are practically the same as in the United States. All cars as a general rule are sold complete; they are not shipped on consignment but are paid for before shipment. They should be packed with good strong timber, thoroughly braced, inside and outside.

Repairs—Chauffeurs—Sales and Advertising Methods

Most of the regular dealers have their own repair shops and garages and carry stocks of repair parts for the various makes which they represent. Chauffeurs can be obtained at salaries ranging from $18 to $35 Mexican per month. They are natives and receive their training in the garages and repair shops.

The sale of automobiles is being vigorously pushed in this district. The advertising commonly resorted to embraces newspapers, both native and foreign, motion-picture screens, billboards, etc. Native salesmen are employed by the various dealers through their compradores to push sales among the Chinese; they are paid on a commission basis. The market is well worked and the prospects for an increasing demand are good, but the trade will not be large until the road facilities are extended and improved. There is no prejudice against American automobiles and they are well regarded by all residents.

Due Respect for Varnish

(Continued from page 39)

good old age. This is one of the reasons why the average painter and varnisher has a great deal of wholesome respect for varnish.

It has always seemed to the writer that the paint shop manager owes it to himself to advise the car owner against certain practices calculated to injure the varnish; to also inform him as to certain methods which may serve to benefit the varnish and add to its life and appearance. As to the latter, let it be known among vehicle owners that when the varnish is of recent application it is entitled to have a pure, clean water bath as often as the car is taken over the road, however short the road may be. This will aid in the maturing of the varnish; it will in addition increase its lustre.

The practice of permitting dust and moist dirt to lay upon the finish as the car is returned to the garage, in the event of a recent visit to the paint shop for painting or varnishing repairs, is productive of spotting, loss of lustre, and a general decline of the entire structure of the varnish. When newly applied to the car it should have close attention to the end that dirt, dust, muddy water and foreign accumulations of every kind may be removed in time to save the surface.

Once the finish has hardened sufficiently to prove immune to the blight of mud, dirty substances and gaseous exhalations, etc., a little more in the way of disregarding these precautions may possibly be indulged in, but in the long run it pays to take care of the surface without reference to the time exposure of the finish.

Another item of neglect which should not be sanctioned by car owners is that of letting the surface serve for a prolonged period between varnishings. This is false economy and cannot be excused save upon exceedingly narrow grounds.

American Automobiles in Rumania

Rumania offers a fertile field for the automobile salesman, according to a Red Cross representative who recently made an economic survey of that country.

Business men there have found much to admire in American ways of doing things and of getting results in a hurry. The one hundred and fifty-odd automobiles and trucks used by the Red Cross have served to introduce American mechanical products to Rumanians. These cars will be sold directly to the Rumanian government upon completion of Red Cross work there, but there will still be a great market for cars of all prices. A certain Detroit car is a familiar sight in Bucharest streets, the French, American and British missions all employing it.

American merchants are flocking to Greece and Constantinople, where one sees American toothpaste, soaps and toilet articles for sale everywhere. But only a few salesmen have as yet reached Rumania, a country which needs everything and soon will have money to pay for it. Red Cross workers declare that Rumania differs from Serbia, Montenegro, Albania, Bosnia and Macedonia, in that Rumania will make a speedy recovery from the war and will have plenty of money as soon as this year's grain crop and oil output are sold.

Van Dorn Electric Tool Co. Enlarges Cleveland Plant

The reorganization of industry back to a peace work basis has shown that production in all lines of endeavor must be kept up to peak-load point in order to supply the ever-increasing demand for more goods, materials and especially tools that aid in minimizing labor costs.

These conditions, reflected in the enlargement of many manufacturing concerns, are shown in the expansion of one of the leading electric tool makers, namely: The Van Dorn Electric Tool Co., Cleveland, Ohio, the phenomenal growth of their business having compelled the addition of a new four-story building, with 30,000 additional feet of floor space.

The facilities of the entire plant are given over to the manufacture of portable electric drills, reamers and grinders, the great demand for these tools resulting from the widespread recognition of their superiority over cumbersome and expensive methods required in handling material in the past. Wherever electric current is available the portable electric tool "goes to the job."

During the war an extensive use was made of the portable drill in shipbuilding, and one application was its suspension in a light "buggy" frame, being moved from place to place to counterbore rivet holes in ship plate.

Holes up to 2 inches in diameter can be drilled with ease in iron or steel. In the smaller sizes the portable electric drill is being used in great numbers in automobile construction.

Inasmuch as tools of this character are subject to hard usage The Van Dorn Electric Tool Co. have from the first built them on sturdy lines—of the most rigid construction throughout—permitting of the greatest accuracy.

Every part of the machine, from the specially constructed motor to the cutting of the gears, and on through the process of tempering and grinding of each part to accuracy within .00025 of an inch, is made complete from the raw material in the Van Dorn plant by skilled artisans.

A big point in their general use is the claim that the smallest of the machines is so constructed that even a strong man cannot exert sufficient pressure in drilling to stall the motor. In other words, the "drill goes right through."

To establish to a certainty that the goods are correct before leaving the Van Dorn plant, a series of seven inspections is required on each part in its process of manufacture, before assembling, and then after final assembly each machine is run against a pressure greater than it would receive under severe working conditions for a period of 1½ hours. The tool is then dis-assembled for inspection, parts being replaced together, and a further 30 minute test is registered.

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Principles of Body Designing

(Continued from page 52)

of 8 to 10 inches is given on the cushion springs, in order to have a comfortable seat.

The width of the dash must be sufficient to allow ample clearance for the feet when operating the pedals. The modern tendency is to have a wide dash, and the figures given are average ones, such as provide clearance.

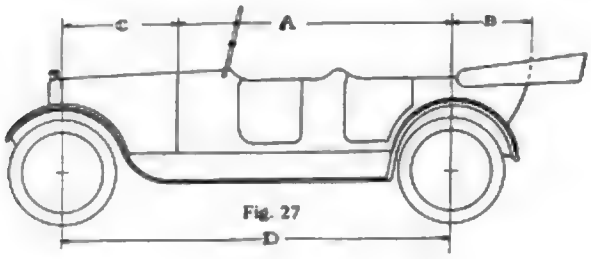


Fig. 27

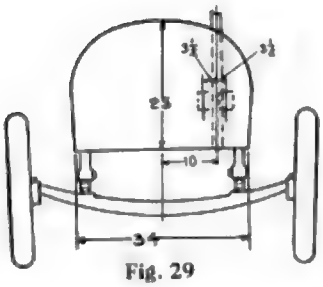


Fig. 29

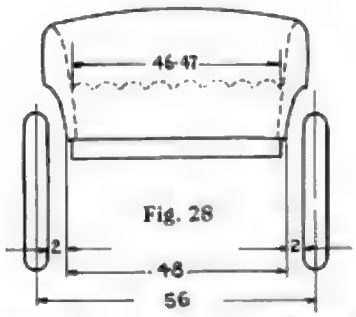


Fig. 28

From the foregoing the reasons for the 46-7 dimension are explained.

The diagram shown in Fig. 29 illustrates the average condition obtained at the dash.

(This series of articles on automobile body design will be continued in the February number and thereafter.—EDITOR.)

Jury Finds Promoter Guilty

A verdict of guilty has been returned against S. C. Pandolfo, chief promoter of the Pan Motor Co., of St. Cloud, Minn., as the result of a trial by jury in the court of Federal Judge Landis, in Chicago. The hearing covered several weeks. The jury found Pandolfo guilty on four counts on an indictment charging the use of the United States mails in a scheme to defraud. All the counts dealt with the mailing of letters to prospective 'stockholders, and alleged misrepresentations of the company's progress and development by stock salesmen.

Along with Pandolfo other officers and directors of the Pan company were indicted, charged with conspiracy to use the mails to defraud; Pandolfo alone was found guilty.

How to Accomplish Rapid Kiln Drying

Every wood-using industry is interested in finding a quick method of seasoning wood, and expects that some day a new type of kiln will be devised which will accomplish more rapid drying. The U. S. Forest Products Laboratory has observed, however, that few kiln operators attain the fastest safe rate of drying possible with present-known equipment, and that *quick, satisfactory drying depends more on the kiln operator than on the kiln itself.*

These are things that when they apply make for slow drying in any kiln:

1. Some one part of the kiln load is drying slowly because of sluggish and uneven circulation, and is holding up the entire kiln run.

2. The kiln operator does not know when the lumber reaches the desired moisture content, and therefore leaves it in the kiln longer than necessary.

3. The lumber may be case hardened and therefore unable to stand fast drying.

4. Lumber air-seasoned six months is given exactly the same treatment as that air-seasoned only four months.

5. The kiln operator does not know the moisture content of the lumber when it is put in the kiln, and therefore can not apply the initial drying conditions which are conducive to most rapid drying.

6. The drying schedule is regulated by the number of days the lumber has been in the kiln, rather than by actual moisture content of the stock and its ability to withstand more severe drying conditions.

7. Steam is not supplied to the heating coils at night.

8. The kiln operator looks at his kiln only once a day, and then does not look at the lumber itself.

It is within the limit of commercial possibility for one-inch lumber to be perfectly kiln-dried from 18 per cent. moisture content (reached, perhaps, in 3 months' yard seasoning) to 5 per cent. moisture content, and conditioned for use, according to the following schedules: Red gum, 6-8 days; hard maple and birch, 5-7 days; plain-sawed oak, 8-10 days; walnut and mahogany, 6-8 days

Winther Announces New Car

A Winther six-passenger car has been announced by the Winther Motor Co. The Winther engineers have been designing and developing this new job for more than a year, according to M. P. Winther, president of the company, who describes it as "a 'six' of the very latest design, with an unusually efficient power plant and a body unique in its simplicity and graceful lines."

No description of the new car has been given to the trade, but it is understood that the complete specifications will be announced within a short time. Factory officials express the hope that the job will be in quantity production early in the spring.

An annual output of more than 8,000 trucks a year is predicted for the Bethlehem Motors Corp., of Allentown, Pa., as the result of the sale of 43,000 shares of new stock which is being offered to the stockholders for subscription, and from which the corporation expects to receive about $1,000,000.

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

WANTED.—Man in body engineering department for detail and general lay out work. Also one who has had experience in making up parts list. Address "740," care THE VEHICLE MONTHLY, Philadelphia.

VEHICLE FACTORY FOR SALE.—A factory plant, located in southeastern Pennsylvania, is offered for sale on account of retirement of owner from active business. Complete body department and smith shop. Electric lights, power, two elevators. Good shipping facilities. Address "Q. C. W.," care THE VEHICLE MONTHLY, Philadelphia.

FOR SALE.—One Kane & Roach Power Hammer. One Gas Heater; One Champion Upsetter. One Heavy Tire Bender (Power). One Tread Machine (Hand Power). Make offer. FRED. ROEDER MFG. CO., 1932-1400 Atlantic Avenue, Brooklyn, N. Y.

WANTED.—Automobile and car body builders to work on commercial and bus bodies. Good wages to right men. Address "725," care THE VEHICLE MONTHLY, Philadelphia.

FOR SALE.—White oak wagon poles, 2 x 6 in. butt, 3 x 3 in. point, 12 ft. lengths. P. F. BOWN MFG. HOUSE, Box 500, Pittsburgh, Pa.

WANTED.—Foreman carriage trimmer. Factory in Central West. City 20,000. Address "730," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—Superintendent for progressive custom top and body shop building custom winter tops and doing a large seat cover and general body repair business. Good salary and excellent opportunities for the right man. Must of course be experienced in automobile top and body work. Address "725," care THE VEHICLE MONTHLY, Philadelphia.

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The MILLER DISAPPEARING CHAIR

An auxiliary seat that adds classiness to the car and provides greater comfort and safety for the passenger.

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Because they give much greater traction.

Because they greatly increase the tire's resiliency.

Because they practically eliminate the traction wave.

These are merely advantages which the notches or side vents add to a tire that even without them would be in a class by itself.

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GENERAL SALES DEPARTMENT
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KELLY SPRINGFIELD TRUCK TIRES



3½-Ton Worm Drive
Gramm - Bernstein

Ready for the Body; Not an Extra to Buy

Cramm-Bernstein savings begin even before the truck is put to work. They actually begin with the very purchase of the chassis.

For it is sold completely equipped and ready for the body. There is literally not an extra to buy.

Gramm-Bernstein Trucks carry, as standard equipment, $500 to $550 worth of accessories, according to type and size.

This equipment is all essential to truck operation. Any truck must have it.

Ordinarily it is paid for over and above the chassis price.

Nothing of the sort with Gramm-Bernstein. It is complete and ready for the body needed in the work it is to do.

In this, as in the industry itself, and in most of its forward steps, B. A. Gramm has led the way.

Gramm-Bernstein Trucks today have behind them something even greater than almost 20 years of truck building and inventive experience.

They have an honorable record of performance and economy—of high duty and low cost.

They are so firmly entrenched that Gramm-Bernstein owners invariably add a Gramm-Bernstein when they need another truck.

Gramm-Bernstein reliability, willingness to work, and extraordinary long life, are almost proverbial among business men who have experienced them.

Any comparison of work done, on a cost-mile basis of operation and maintenance, will demonstrate the greater economy of Gramm-Bernstein.

Any comparison of truck experience, truck units and truck equipment will demonstrate the greater value of Gramm-Bernstein.

Any Gramm-Bernstein dealer will be glad to advise with you.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Patent Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194994

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Ball Bearing Trailer Axles with Interchangeable Sarven and Artillery Hubs

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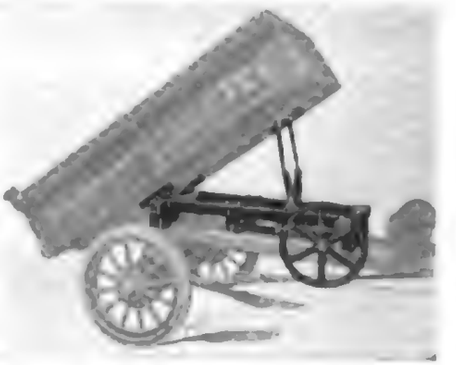
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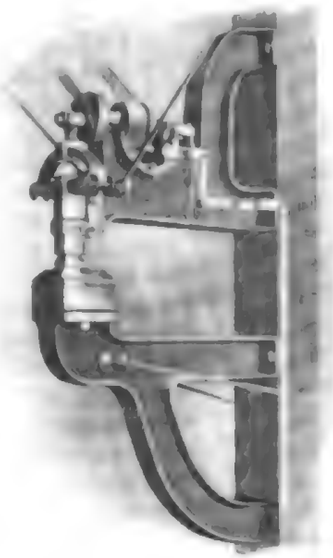
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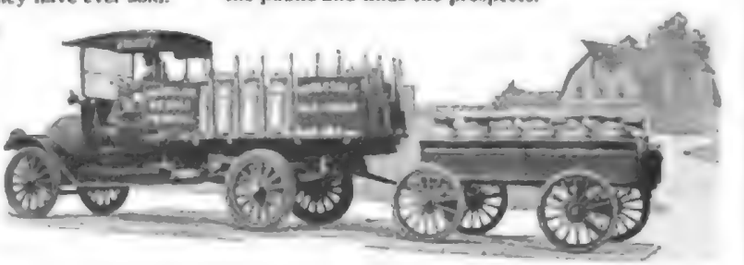
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This Factory and Equipment
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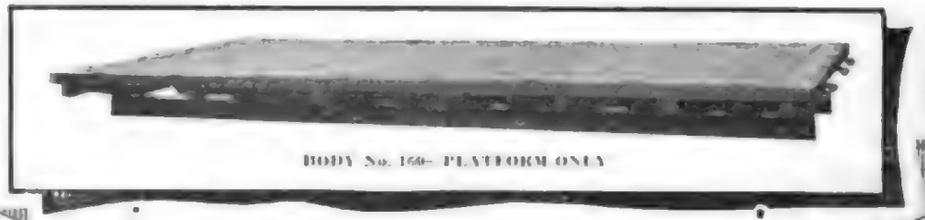
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Owner's sole reason for selling is desire for retirement on account of age.

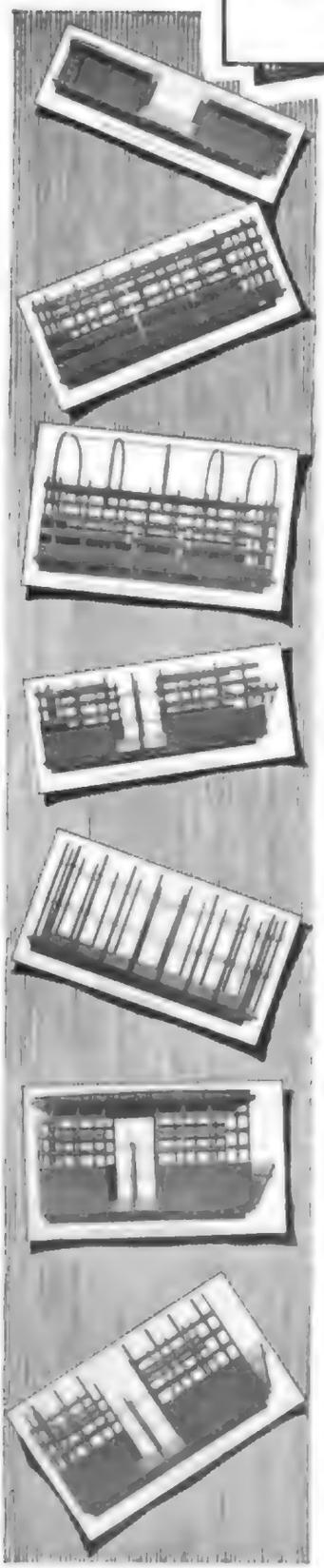
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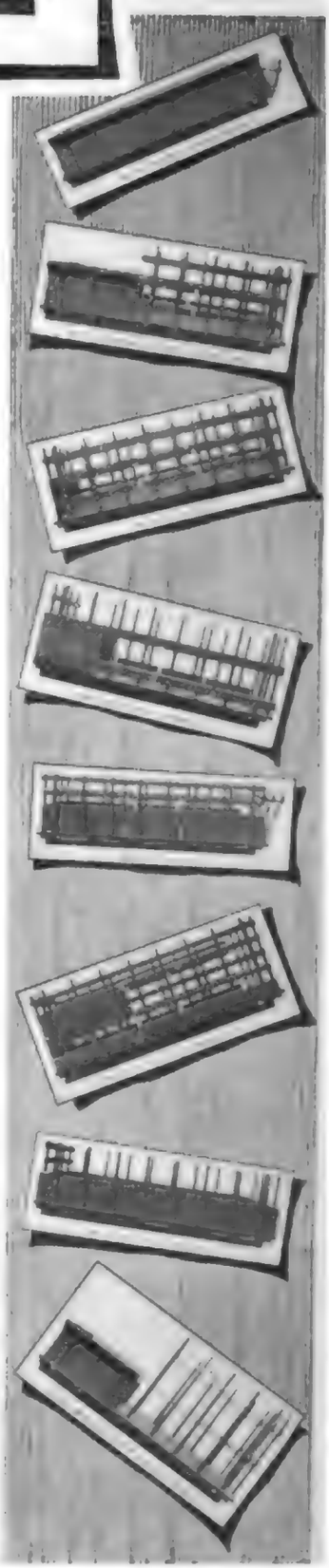
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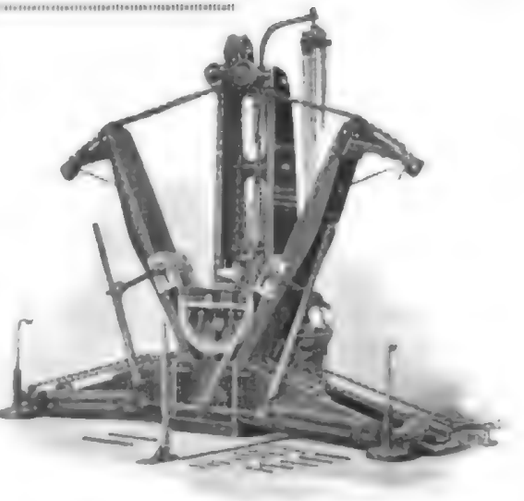
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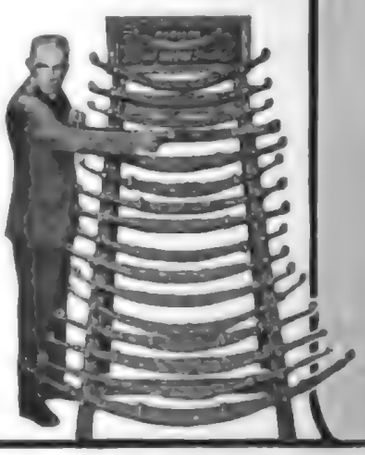
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The Special Productions Department is not a makeshift group of men in a far corner of one floor but an organization completely equipped with facilities to turn out quantity and quality special products with good service.

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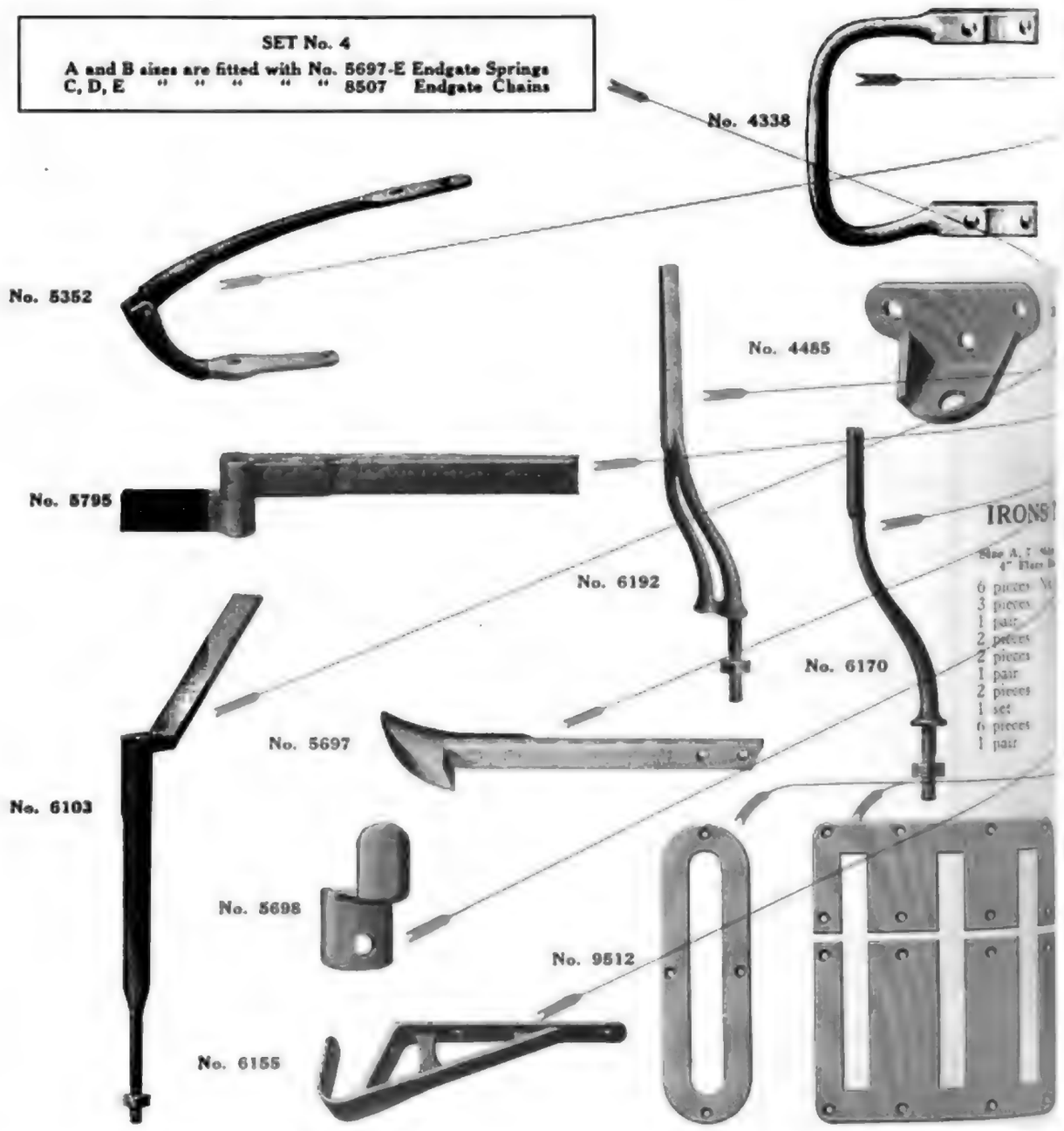
Millions of Catches and Hinges for Browning Ammunition Belt Boxes were manufactured by The Stanley Works

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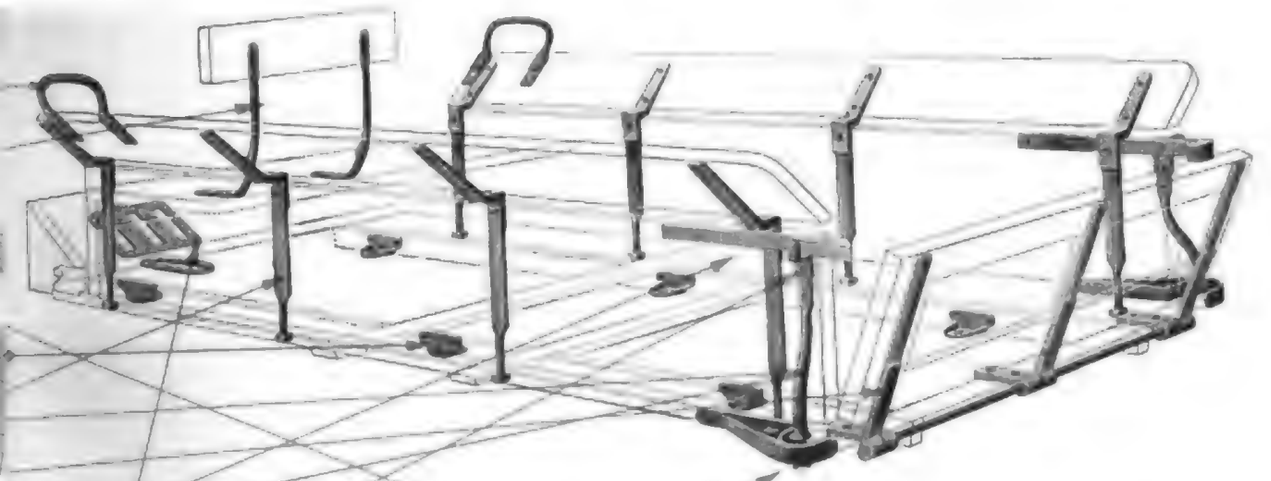
EMCO MALLI

SET No. 4
A and B sizes are fitted with No. 5697-E Endgate Springs
C, D, E " " " " " 8507 Endgate Chains



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EABLE IRONS



Set No. 4

Emco Quality Insures Service

OPEN FLARE BOARD BODY
EDED IN THE CONSTRUCTION OF THIS BODY



Write for our Bulletin "Assemblies of Irons"

el	Size B, 8" Side Panel 5" Flare Board			Size C, 10" Side Panel 6" Flare Board		Size D, 12" Side Panel 7" Flare Board		Size E, 14" Side Panel 8" Flare Board		
8-A	6 pieces	No. 6103-H	Body Brace and Flare Board Irons	8 pieces	No. 6103-C	8 pieces	No. 6103-D	8 pieces	No. 6102-M	Body Brace and Flare Board Irons
5-A	3 pieces	5795-A	Endgate Hinges	3 pieces	5795-C	3 pieces	5792-D	3 pieces	5792-G	Endgate Hinges
7-E	1 pair	8507-E	Endgate Springs	1 pair	8507-A	1 pair	8507-B	1 pair	8507-C	Endgate Chains
4-A	2 pieces	5698-A	Endgate Spring Guards	1 pair	6192-A	1 pair	6192-B	1 pair	6192-B	Body Braces, rear end
3-L	2 pieces	6170-M	Body braces, rear end	1 pair	6182-B	1 pair	6182-B	1 pair	6182-B	Body Chain Eyes
2	1 pair	5352	Jointed Lazy Back Irons	1 pair	5352	1 pair	5352	1 pair	5352	Jointed Lazy Back Irons
6	2 pieces	4338	Seat Handles	2 pieces	6141-H	2 pieces	6141-G	1 set	6141-G	Inside Corner Irons
2	1 set	9512	Foot Board Plates	6 pieces	4485	6 pieces	4485	1 pair	4485	Body and Chassis Connections
5	6 pieces	4485	Body and Chassis Connections	2 pieces	4338	2 pieces	4338	2 pieces	4338	Seat Handles
5-A	1 pair	6155-A	Sill Braces	1 set	9512	1 set	9512	6 pieces	9512	Foot Board Plates
				1 pair	6155-A	1 pair	6155-A	2 pieces	6155-A	Sill Braces

The Eberhard Manufacturing Co.
CLEVELAND, OHIO, U. S. A.

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"SEARS-CROSS LOCK" FOR AUTOMOBILE DOORS

"The Lock with the Expanding Latch"

(Manufactured under the Ottinger Patents)



LOCK No. 1200

This is the only FOOLPROOF ANTI-RATTLE LOCK on the market.

The Latch Bolt of the "SEARS-CROSS LOCK" is identical to the ordinary latch bolt, both as to its general appearance and automatic action, *with the exception* that it incorporates the expanding feature consisting of a simple rocker which cannot get out of order.

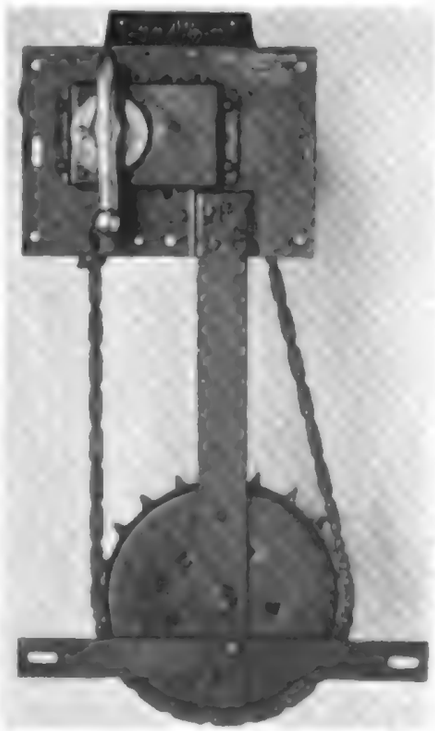
It perfects the action of the latch bolt in that it completely takes up the clearance which is necessary for the ordinary latch bolt to enter behind the striker, and *holds the door absolutely tight* instead of merely loosely latching it and depending on rubber bumpers to tighten the door.

Another feature of the "SEARS-CROSS LOCK" is that the lock handles cannot rattle.

The most perfect and highest grade door lock in use today. Has been adopted as standard equipment by a great many motor car manufacturers and body builders.

Made for all priced cars, open and enclosed bodies

SEARS-CROSS COMPANY, Bush Terminal, BROOKLYN, N. Y.



STANDARD TYPE

The Perfect Window Regulator

STANDARD EQUIPMENT ON LEADING AMERICAN CARS

because

It automatically locks window at any height.

It prevents rattling of glass.

It operates noiselessly.

It is easily installed.

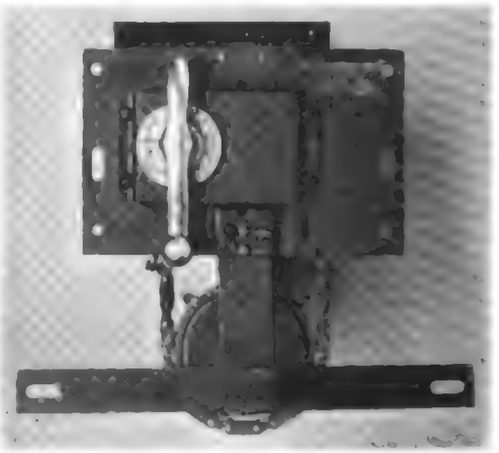
Its steel parts are rust-proof.

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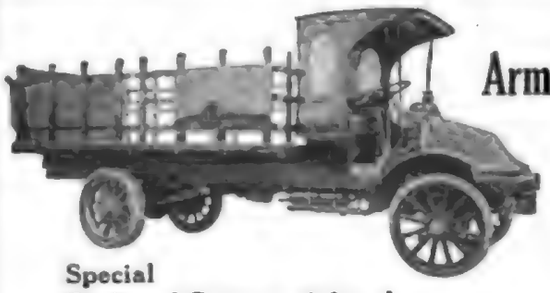


SPECIAL TYPE FOR REAR QUARTER

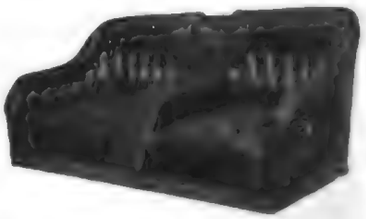
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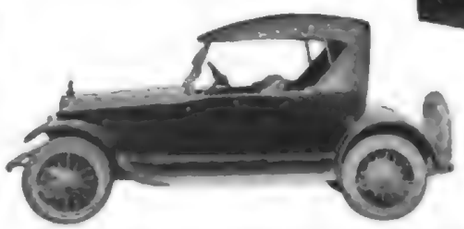


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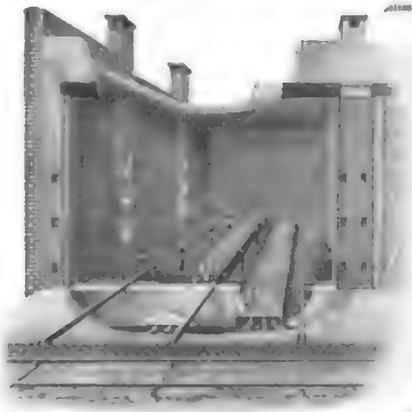
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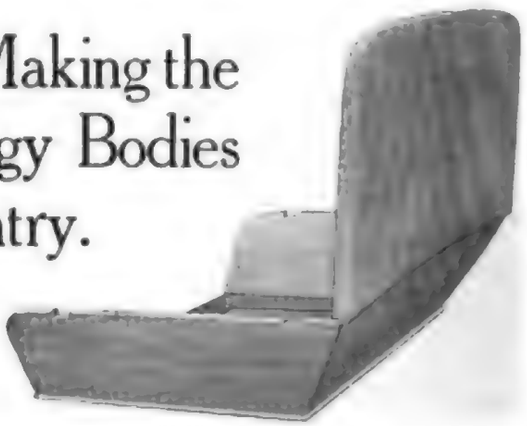
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It dries Oak green from the saw, also hickory, ash, pine, poplar and all other hard and soft woods. *Write for Catalog.*

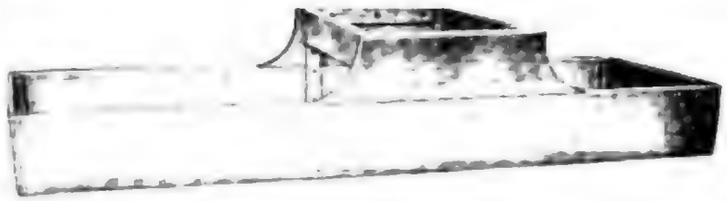
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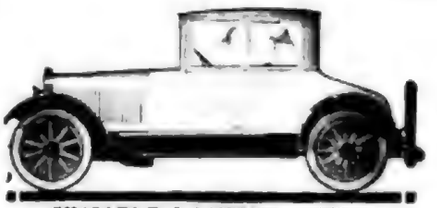
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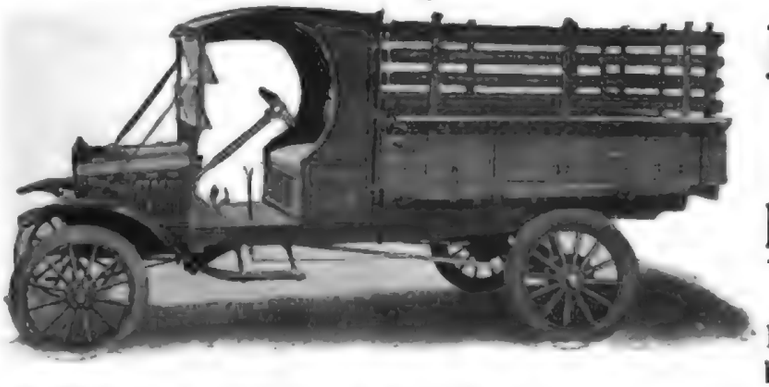


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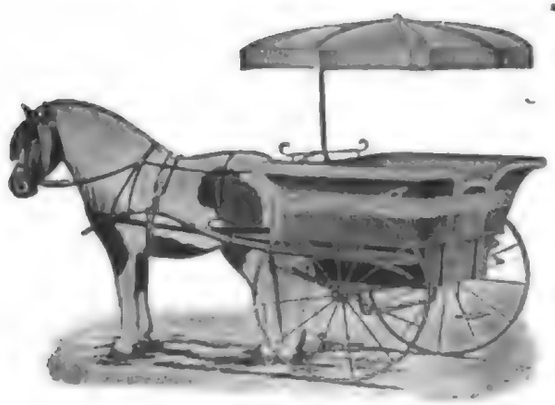
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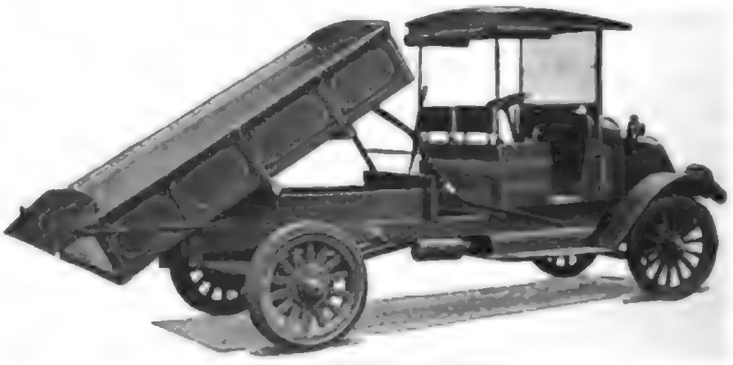
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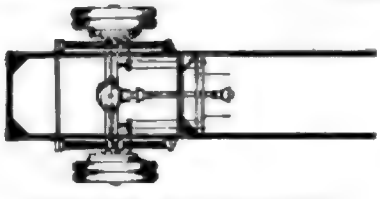
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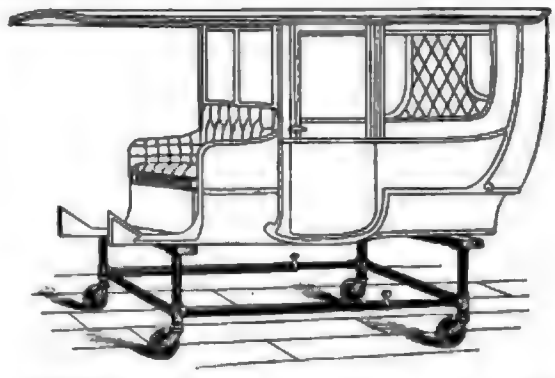
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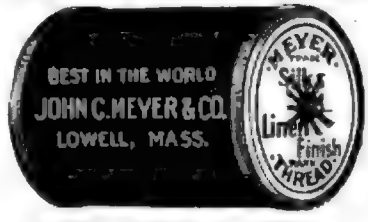
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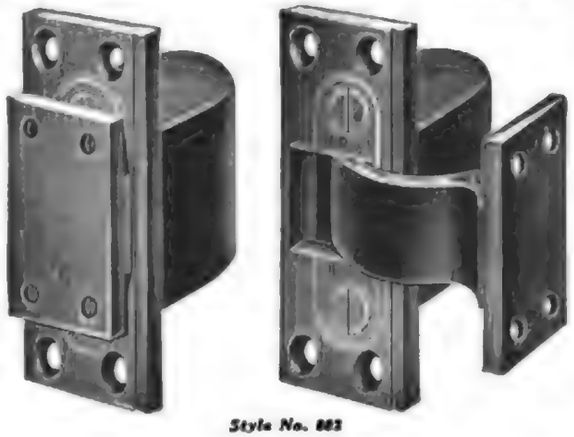
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It provides for the use of

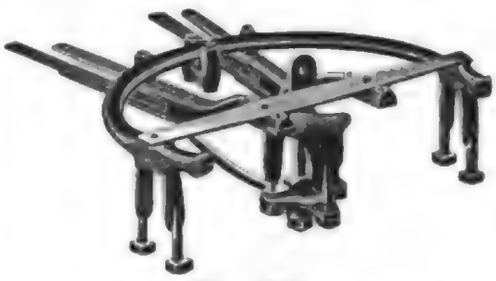
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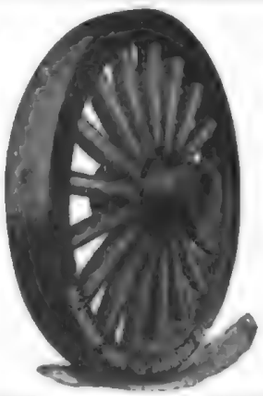
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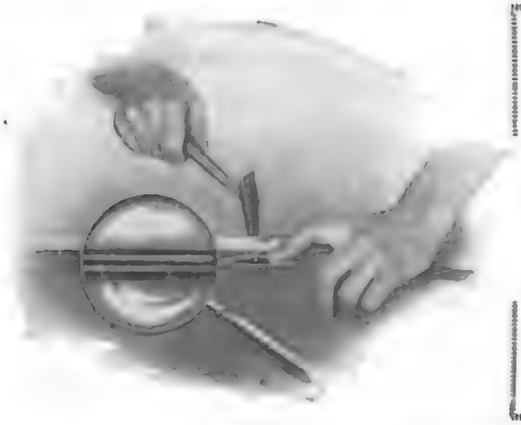
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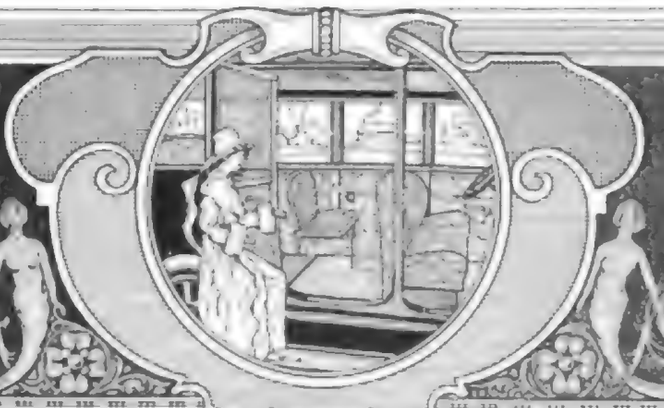
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In some respects 'tis better"

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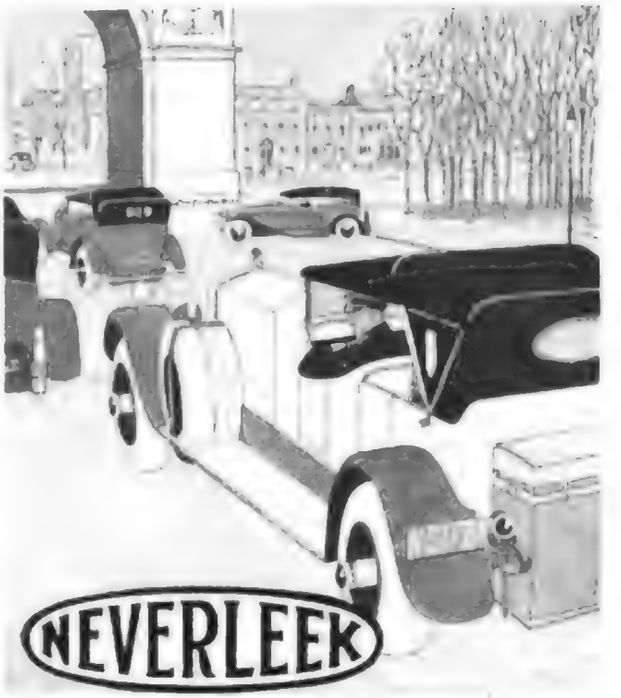
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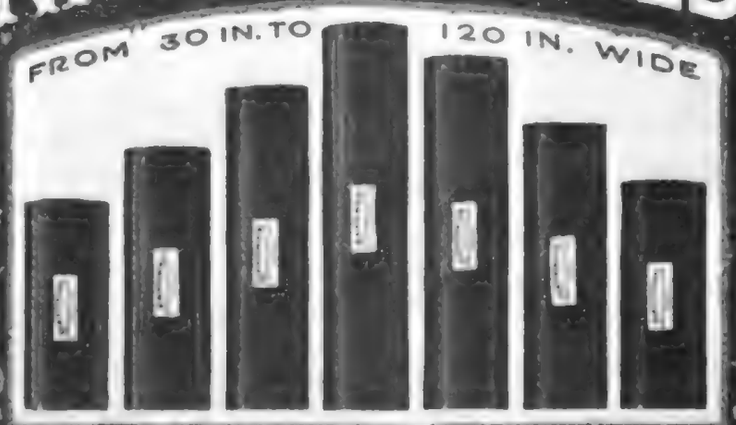
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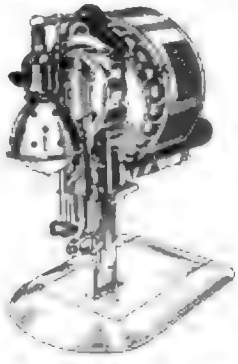
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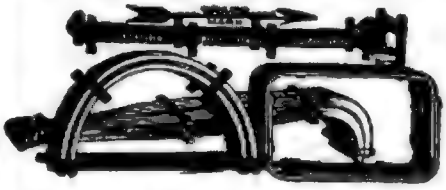
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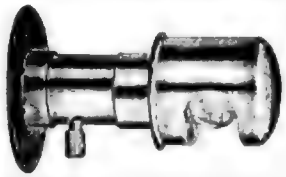
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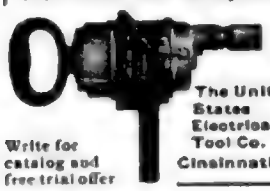
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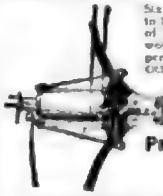
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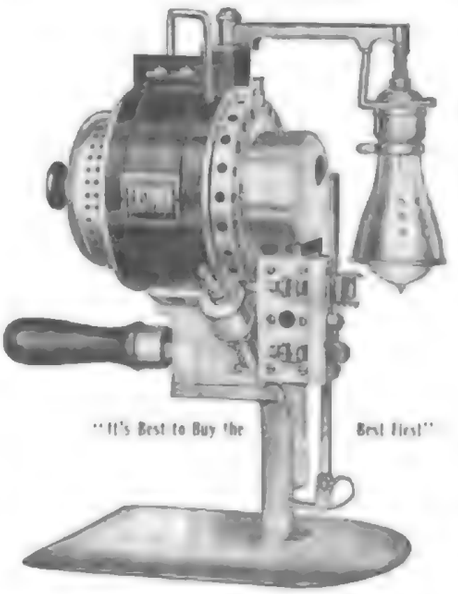
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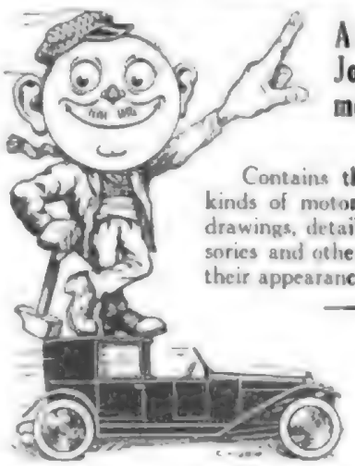
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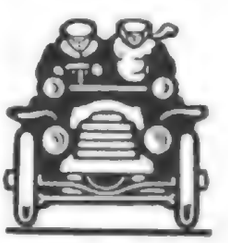
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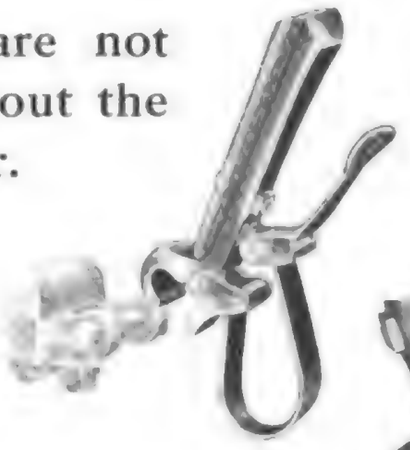
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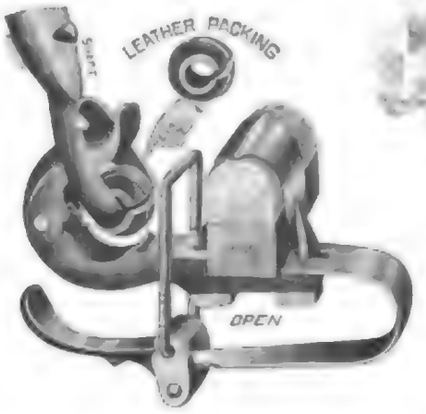
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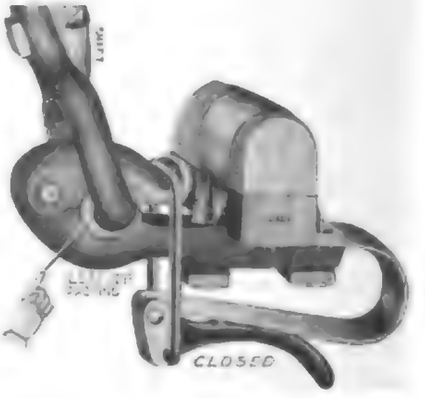
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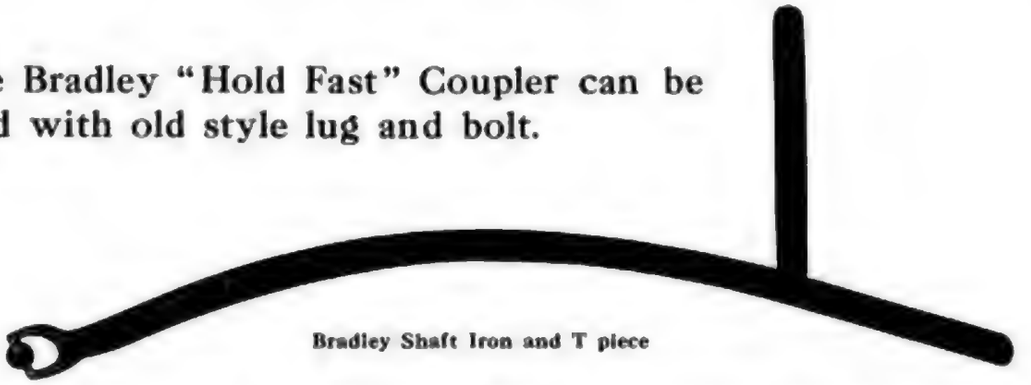




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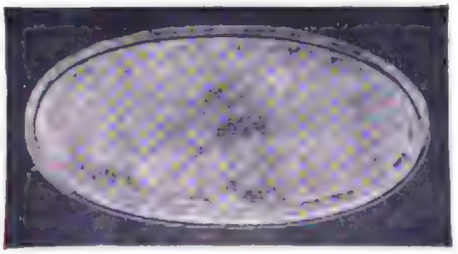
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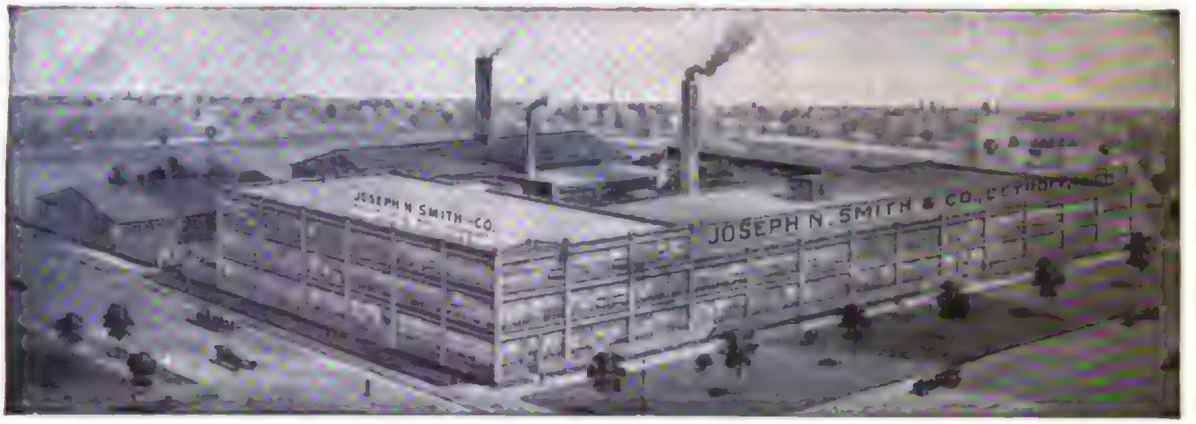


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Twenty-second Anniversary of the First Motor Vehicle Sale

By CHARLES CLIFTON, President National Automobile Chamber of Commerce.

Next April will celebrate the twenty-second anniversary of the first sale of a motor vehicle in the United States, because it was in April, 1898, that an American manufacturer made the sale to an individual which was the forerunner of the sale of 1,800,000 motor vehicles during the past year. The development of this wonderful industry has occurred within the recollection of the present generation and is a manifestation of the indomitable perseverance and real progressiveness of the American people.

The automobile, which was conceived in Europe, has found its greatest development in the United States. Many of the American pioneers are still living and reaping the benefits of their early sacrifices. Charles E. Duryea, Elwood Haynes, the Apperson Brothers, R. E. Olds, Alexander Winton and Henry Ford are today national personages. Their genius has brought to millions of their countrymen undreamed-of pleasures and prosperity.

Fifty years ago, the automobile was the experiment of a few intrepid inventors. It was classed, by the public, with the inventions of Jules Verne, wonderful but impractical. Not even in their wildest fancies did the early inventors conceive that their inventions would grow to be the third greatest manufacturing industry in the country.

Surprising as it may seem, the automobile is the progenitor of the locomotive. The first automobile was built and tried fifty years before the first railroad track was laid.

Captain Nicholas Joseph Gugnot is accredited with having constructed in 1769 the first motor-propelled road vehicle that actually ran. Steam was the activating force. This machine was clumsy, overbalanced and difficult to steer. It was partly wrecked on one of its trips and never rebuilt. It was placed in the Conservatory of Arts and Trades in Paris where today it is still an object of much interest.

In 1787 Oliver Evans, of Philadelphia, built the first American automobile under a patent granted by the State of Maryland. It also was so awkward and heavy that public opinion vetoed its practicability and the inventor was forced to abandon his further experiments. In 1831 Walter Hancock, an Englishman, built a steam car that he called the "Infant." This car made regular trips between London and Stratford and in 1832 the distance was extended to Brighton. This vehicle carried eleven passengers and was run at an average speed of nine miles an hour.

The Gasoline Era

About 1874 Gottlieb Daimler and Carl Benz began their basic experiments in the field of internal combustion, hydrocarbon motors. On May 8, 1879, George Baldwin Selden, of Rochester, New York, filed an application for a patent covering the use of the gasoline motor as a propelling force of a road vehicle and upon the vehicle as a whole. This application was the pioneer patent of the industry. Selden did not build a car until some years after his patent was granted. While Carl Benz, of Mannheim, Germany, built the first internal combustion hydrocarbon motor-propelled vehicle in 1885, it was not until 1893 that the automobile practically as it is known today was launched. Panhard & Levassor, in this year manufactured 350 motors, nearly all of which were sold.

The first road race run in 1894 was known as the Paris-Rouen race over a course of 80 miles. It had an entry list of 46 cars of which 12 were steamers. The first prize, $1,000, was awarded to Panhard & Levassor and Peugeot, whose entries were equipped with 3½-horsepower motors. "The Times-Herald" road race from Chicago to Waukegan, Ill., and return, on Thanksgiving Day, 1895, was the first American road race. Only two cars were entered in this contest.

In America, Charles E. Duryea and Elwood Haynes were the first to build gasoline vehicles that would run. The exact date, on which these respective American pioneers first ran their cars, is not accurately recorded, but it was some time in 1892.

To Alexander Winton goes the credit of selling the first American automobile. On April 1, 1898, he sold a one-cylinder Winton automobile to Robert Allison, of Port Carbon, Pa. Allison ran the car for two years and at Winton's solicitation sold it back to the Winton Company where it is still in existence, practically as capable of delivering service as it was the day it was shipped to its purchaser.

All these vehicles were of the "horseless carriage" type. It was not until 1901 or 1902 that the automobile, based upon the European Panhard & Levassor type, was introduced. The difference between this European model and the "horseless wagon" was that in the former a central frame to carry the power plant and act as the keystone of the car structure was developed. This idea is basic in modern automobile manufacturing.

Trucks

The history of the motor truck antedates the passenger automobile. Gugnot, in France, Hancock and Russell in England and Owens in America, designed their self-propelled vehicles for commercial purposes. Gugnot's first venture was a machine to haul heavy artillery. Hancock's and Russell's machines were designed as commercial stages, while Owens' experiments aimed at a practical road wagon. The passenger car came as such only after the pioneer experiments of Daimler and Benz in the year 1885.

The possibilities of commercializing the automobile were perceived by many of the

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American pioneers. While the exact origin of the commercial car is somewhat obscured, evidence seems to favor Charles S. Woods, a carriage builder, of Chicago, as the first manufacturer. His cars were run by electricity.

By placing a paneled delivery body on their passenger car chassis, the Winton Company in 1899 produced a commercial car which was sold to the U. S. Post Office Department.

In the next few years there was a great development of electric, and in a lesser degree steam trucks. Until 1906 the tremendous activity of the passenger car manufacturers obscured the potentialities of the commercial vehicle, but in this year came general recognition of the arrival of the motor truck. It may be said that at this time the manufacture of the truck became a distinct industry.

There are now about 550 or more vehicle manufacturers in the United States, who with 6789 concerns manufacturing some article used in the automobile trade, employ more than 830,000 persons, half as many as are employed by all the railroads and approximately 8 per cent. of all the people engaged in manufacturing and mechanical industries. The number of persons dependent upon this industry is almost 3,000,000. There are in use in this country alone more than 6,400,000 automobiles and approximately 600,000 motor trucks. These motor vehicles have paid to the States almost $60,000,000 in fees during the past year.

Motor Trucks in Business

The motor truck has invaded over four hundred different trades. Its value has become so generally recognized that practically no industry or trade is not included in this list. In a compilation of 38 trades, made January 1, 1918, by "Power Wagon," it was found that there were 8171 fleet owners operating 67,446 vehicles, and 115,105 individual owners operating 271,742 vehicles. These 339,188 cars had a value of $929,980,000. Farmers are the biggest users of trucks, with 78,000 to their credit.

The Boston Motor Show

The Motor and Accessory Manufacturers Association has officially sanctioned the Eighteenth Annual Boston Automobile Show, to be held at the Mechanics Building, Boston, March 13 to 20, 1920, inclusive. Approximately 105,000 square feet of floor space are available for exhibition purposes, and the show next March is expected to surpass all previous records.

In announcing the sanction granted by the Board of Directors, M. L. Heminway, general manager of the association, expressed the opinion that the forthcoming automobile shows at New York, Chicago and Boston would be the greatest in the history of the automobile industry.

The Berg-Kenzel Co., 600 Market Street, San Francisco, has been appointed distributing headquarters for California and Nevada for the Howard Auto Headlight Deflector Co., Detroit, Mich.

A Motorized World

By Roland R. Conklin, President, Chicago Motor Bus Company.

In the mass of cable dispatches from England recently, one small item appeared which is of vast importance to the motor world. It told of the determination to continue the use of motor lorries for the transportation of certain types of freight and express.

During the recent railroad strike in Great Britain, hundreds of these motor trucks which were used during the war were put into freight and express service as an "emergency measure," but like the man who went to scoff and stayed to pray, these trucks are to be used permanently for hauling small package freight for short distances.

The transportation authorities found that yards and warehouses were terribly congested when this great railroad strike began. The first few days found increased confusion, and then the motor truck entered into the situation. It was backed up at a freight warehouse, loaded, and then set out upon its destination, dropping packages at way stations. During the first few days of the new service, such packages as were paid for were not left at a freight station, but were delivered at the house of the consignee, thereby obviating the necessity of an extra handling. This soon proved to be one of the great advantages of the motor truck in handling this freight, and was a decisive factor in making truck lines permanent.

It won't be long before a motor truck will drive up to a factory in London and take on a sewing machine consigned to Manchester, delivering it there to the party who expects to operate it. Under the old method the machine would have been delivered to a railroad freight station where it would have been unloaded from the delivery wagon onto a platform, and then loaded into the freight car. Perhaps it would again be transferred en route. At Manchester it would have been unloaded from the freight car, reloaded onto a wagon, and then delivered.

The action of the English traffic experts in continuing this service is highly significant, and I believe marks the beginning of a new method of handling small package freight and express in civilized countries the world over. I think in this situation the English have set an example which we may well follow in the more thickly populated sections of the United States. In fact, that has been done to a limited degree between Washington and Philadelphia, New York and Boston, and I believe it will not be so many years before motor express lines will be running between all the large cities of the East and Middle West.

The advent of the concrete road which is making its appearance in the Middle West and in certain parts of the North Atlantic States will be a great help in this direction.

It is quite practicable to build large, roomy busses, which can carry passengers on top and freight below. Even granting that special construction of concrete roads would be necessary on the part of the operating company, freight and passengers could be carried more quickly and with greater safety and speed than on the present interurban electric lines. Concrete roads can be constructed at approximately $20,000 per mile, and not over $15,000 investment per bus-truck would be necessary in installing a freight and passenger bus line, allowing for garages, repair shops and storage warehouses. Taking into consideration the cost of grading, rails, cross ties, trolley poles, wires and the maintenance of power houses and highly complex equipment necessary in conducting an interurban line, motor vehicles on their own concrete roads will very successfully compete with the electric carrier. In fact, just as the electric interurban is a competitor in certain circumstances to steam railroads so will the motor vehicle take certain business from the railways.

Under the easiest conditions, it costs at least $50,000 per mile to build a steam railroad. This would be on flat country, where no great engineering difficulties would be encountered. For distances such as those between Washington and New York, New York and Boston, Boston and Buffalo, Chicago and Springfield, Fort Worth and San Antonio, motor vehicle lines running on concrete roads, might very well compete in efficiency with the railroad train in the handling of small package freight and express, in fact reducing the cost to the public very considerably.

The reasons why this competition could be carried on successfully are practically the same reasons which give the motor bus the advantage over the electric car, and in addition there would be greater mobility in the gathering of freight and material, and the avoidance of terminal congestion at both ends of the line.

Some of the advantages of the motor bus over the electric carrier are:

1. Greater mobility.
2. Absence of tracks.
3. Continual expansion to meet newly developed needs.
4. Ease with which routing can be shifted without loss of equipment.
5. Mechanical difficulties do not obstruct all following vehicles and interrupt schedule.
6. Possibility of maintaining better schedules and intensive service.
7. Weight of vehicle per passenger less than that of common electric carriers.
8. More efficient for certain kinds of traffic.
9. Makes available for pleasure and business residential thoroughfares closed to the common electric carriers.
10. Act as feeders to more rapid and long line electric carrier.

It will not be very long before far-sighted capitalists will be placing enormous sums of money in motor vehicle lines of all types. The fact that the motor does the work best and cheapest makes it the logical method of transportation in places where the roads make it possible.

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One reason that capital is halting on the threshold of this motorized world is so that it may have time to look around and see in what manner the enormous investment involved in the older methods of transportation can be cared for.

It is conceivable that the owners of horse-drawn stage coaches, horse dealers, farriers, tavern keepers, and holders of turnpike stock felt very much the same way some 80 years ago when the puffing, rattling, screeching thing of steel and iron called a train first made its appearance, and thousands of persons can recall the difficulties placed in the way of cable and electric cars by the owners of mule and horse car lines when the more modern method of transportation, the electric car, began to drive the other out of business.

I do not mean to say that the motor vehicles will to any great extent take the place of steam railroads, except insofar as they can the more economically move freight and passengers for short hauls, but I do believe that the motor has sounded the death knell of the old-fashioned street car, that the interurban electric line is going to go next and that these passe forms of transportation will be laid to rest just as soon as some method can be found to care for the enormous investments involved.

Dress Your Best Salesman Well

The catalog is many a manufacturer's and jobber's best salesman. It is always handy when the customer is ready to order. It doesn't argue, waste time nor try patience by telling ancient jokes.

What manufacturer or jobber would think of sending out his best human salesman dressed in a flimsy, ragged costume? Yet most catalogs go out in paper covers, which soon become ragged, torn and dirty; sometimes to such a degree that they are cast in the waste basket as too disreputable to have around the office. Many an order has been lost by the disappearance of a catalog; the customer having nothing from which to order.

A leather substitute makes an excellent catalog cover. It has a cotton fabric base which is coated with a pyroxylin compound. This makes it waterproof. It can be washed if it becomes soiled. It may be used, the same as cloth or leather, over pasteboard if a stiff cover is desired, or without the stiffening if a flexible cover is preferred. The same process is employed for printing on the front or back covers that is used on leather bindings. The goods are durable and may be had in practically all the standard leather colors and grains.

R. E. Rodriguez, 56-58 Warren Street, New York, has enlarged his office quarters, putting in an attractive partition between the hallway and the office and adding several new desks. Mr. Rodriguez specializes in paint and varnish brushes, polishing compounds, rubbing bricks, waterproof fillers and leather dressings. He is also eastern agent for the Ditzler Color Co., Detroit.

America, the World's Automobile Factory

Nine-tenths of all the automobiles in the world were built in the United States. We exported $63,000,000 worth of passenger cars and motor trucks in 1918, despite our greatly curtailed production. Of these 41 went to Iceland and the Faroe Islands. In the first nine months this year motor car and truck exports exceeded $75,000,000, at which rate the year's exportation will be above $100,000,000, or an increase of nearly 60 per cent. over last year. The authority for these interesting facts is J. Walter Drake, chairman of the Foreign Trade Committee of the National Automobile Chamber of Commerce and chairman of the Board of the Hupp Motor Car Corporation.

"In spite of the increasing foreign business," said Mr. Drake, "the demand is still gaining in its long lead over supply. I believe it would be rash indeed to venture an estimate of the number of cars that, if available, could be disposed of immediately, for at present we are the world's only appreciable source of supply for motor cars and trucks.

"Meanwhile the home demand also is so great that buyers could have nothing, if we were not arbitrarily setting aside a certain percentage of our production for export, regardless of our unfilled domestic orders. We appreciate that although we do not need the foreign business now, we will later when it will be harder to get. Now is the time to establish ourselves in those markets.

"A fair amount of export trade will be most helpful to the industry when normal conditions return. It will keep our plants that have been enlarged during this peak demand, working at more nearly their full capacity, which will mean economy in production and the ability to sell at a profit against keener competition. Also there will be, of course, the greater total profit on the greater volume of business. What counts most, perhaps, is that a world-wide trade feels less effect from the seasons; the year around demand is more nearly uniform and labor can be kept more constantly employed. Many other reasons might be given why it is wise for our automobile makers to go after foreign business now.

"The truth is that it is seeking us. Every day requests come to our New York headquarters from those wanting to represent American cars in foreign territory. Just now, at the show season, a great many are here from abroad looking for connections.

"American makers set the standard in quantity production and now the European makers are purposing to follow suit. At first we borrowed from the foreign builders many ideas in mechanical fundamentals, then we pioneered in standardization and now we are matching them in workmanship and excellence of details. Better finish, more attention to completeness of equipment, more attractive body designs and enhanced comfort and convenience have brought our product on a par with the best in the world. They are now working for standardization and we are glad to have them as competitors on this basis. The former criticism that in quality the American product compared unfavorably with the European no longer applies.

"Of all our achievements the one of outstanding appeal to experienced buyers is our superior service. Owners realize that the best constructed car or truck is not immune from wear and mishap. Sooner or later repairs and replacements will be necessary. Protection of their investment therefore demands that they buy those makes for which they can most quickly secure parts and service.

"We American makers are very jealous of our reputation in this regard and are conscious that in entering foreign markets we must insist that our representatives immediately establish service stations and stock parts. Upon this service quite as much as upon quantity production and quality product depends the future maintenance of America's present premier position in the world's automobile industry."

New York Aeronautical Exposition

When the Manufacturers' Aircraft Association holds its Second Annual Aeronautical Exposition at the Seventy-first Regiment Armory, 34th Street and Park Avenue, New York, in March, 1920, the public will have an opportunity to see what American designers have accomplished in developing commercial airplanes—planes for private use, for sporting or touring purposes—or long-distance transportation of freight and mail.

The airplane owes its development principally to the war. Since hostilities ceased, however, American manufacturers have concentrated their efforts on planes for pleasure, sport and commercial uses. The exhibits will represent all producing airplane factories in daily flights. Some of the larger ones are carrying mail between principal cities. Others of advanced construction will receive trial flights a few weeks before the exposition opens, March 6th.

Many of the models have comfortable, enclosed cabins with unbreakable glass windows. They seat from four to twelve passengers in chairs as luxuriously appointed as those of a Pullman. Noise of the motors is deadened and passengers enjoy a flight much the same as if they were riding in an observation car or limousine without the wheels touching the ground.

Many of the smaller machines are of the limousine type, accommodating two or three persons. They are, of course, much more inexpensive, both in initial cost and expense of operation.

Gomery-Schwartz Motor Car Co., 128 Broad Street, Philadelphia, has filed plans for an 8-story brick and reinforced concrete machine works and automobile service building, 137x446 ft., at Twenty-fourth and Market Streets, to cost $1,000,000, including equipment.

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The New York Palace Show

It was a dramatic moment when the great entrance of the Grand Central Palace was thrown open Saturday, January 3d, to admit the public to the four-floor display of the greatest national passenger automobile show in automobile history. Hundreds of men and women who before the war gave little or merely passing attention were there because during the war they became chummy, under the stress of war, with carburetors, tires, mufflers and gears and all other parts of a motor car.

In the minds of thousands who attend them each year the National Automobile Shows set the fashion in automobile chassis and body design. And the investigating crowds were interested to learn that the unprecedented demand for cars since the armistice has forced the manufacturers, under whose auspices the show was given, to concentrate on production rather than on new designs. However, even New York and her equally critical visitors who came to the passenger car show were certainly not disappointed in the qualities and varieties that were spread out before them in the Grand Central Palace.



A GLIMPSE OF THE GRAND CENTRAL PALACE SHOW IN NEW YORK

In the foreground is shown the new "Thoroughbred" chassis of the Lexington Motor Co., Indianapolis, which was formerly announced at the Show.

Scores and scores of cars were to be seen, divided into eighty-four individual exhibits. By observation and conversation with the exhibitors the visitors to the show learned that at the present time, in the opinion of those who know, there is not a single manufacturer who is not putting out the best car he can build.

From the standpoints of accuracy and workmanship of manufacture the war had a wonderful effect through its requirement of efficiency and intensive solution of manufacturing problems. Makers, engineers and workmen progressed further than would have been possible in several times as many years of peace.

Care in assembly and the elimination of a great many unnecessary parts have resulted in reducing rattles and repairs. Better methods of attaching the body to the chassis were in evidence, as were other little refinements that enable cars to go farther over rough roads without developing squeaks and other unpleasant features.

Then, too, there were scores of accessories: tires, magnetos, handy appliances and tools; labor and time-saving ideas embodied in the most practical forms. The show proved wholly fascinating, notably to people outside of the mechanical "know," as it naturally is to those who work in the field.

New York's cosmopolitan men and women of fashion and society flocked to the show in crowds. To stay away would be to miss innumerable opportunities of observing the



CHALMERS LIMOUSINE LANDAULET SHOWN AT THE NEW YORK SHOW.

The limousine landaulet differs from the standard limousine only in so far as the special top is concerned. This folding top is of unusual strength, holding rigidly when secured with four locks. Deep, rich colorings give the finish of this car a superior touch. The rich fabrics and good taste of the interior create an air of expensive comfort.

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progress achieved in the industry of third importance to the nation, and one which touches the daily life of all of our people very closely.

Cars were on exhibit to appeal to every capacity of pocketbook as well as to every whim of taste. Models ranged in price from $715 to more than $11,000.

Once the exception, the closed car is now in general use, the increased demand being created solely by its utility. Enclosed bodies really dominated the show.

Indeed, the closed car rapidly is usurping the dominance of the open car in the field of touring and long distance runs. With the enclosed car the tourist no longer is subjected to the discomforture of dust, wind or inclement weather. Now when he arrives at his destination he steps from his closed car clean, fresh and free from fatigue.

The type which holds special appeal for the owner-driver is the sedan. The coupé serves much the same purpose as the sedan except that it is not so commodious. The brougham and town brougham are ideal town cars. Formerly they were confined to shopping, theatre and similar town uses, but now it also is seen on the road.

The big passenger car show was under the direction of a committee comprising John N. Willys, Willys-Overland Company, chairman; H. G. Root, Westcott Motor Car Company, and Harry M. Jewett, Paige-Detroit Motor Car Company.

List of Cars Exhibited

The following are the makes of passenger cars which were on exhibition at the Palace: Holmes, Templar, Cleveland, Allen, American Beauty, Anderson, Apperson, Auburn, Biddle, Briscoe, Buick, Cadillac, Case, Chalmers, Chandler, Chevrolet, Cole, Columbia, Comet, Commonwealth, Crow-Elkhart, Davis, Detroit-Electric, Dixie-Flyer, Dodge Bros., Dorris, Dort, Elcar, Elgin, Fiat, Fergus, Franklin, Grant, Haynes, Hollier, Hudson, Hupmobile, Jackson, Jordan, King, Kissel-Kar, Kline-Kar, Lexington, Liberty, McFarlan, Maibohm, Marmon, Maxwell, Mercer, Metz, Milburn-Electric, Mitchell, R. & V. Monitor, Moon, Nash, National, Oakland, Oldsmobile, Pontiac, Overland, Owen-Magnetic, Packard, Paige, Paterson, Peerless, Pierce-Arrow, Premier, Reo, Roamer, Saxon, Sayers, Scripps-Booth, Standard, Stanley, Stearns-Westcott, Willys-Knight, Winton.

New York Truck Show a Huge Success

When the public was admitted to the 20th Annual Motor Truck Show, January 3, it saw the greatest collection of commercial motor vehicles ever gathered together in the largest building devoted to display of the products of any single industry. For most of the visitors it was their first visit to the Eighth Coast Artillery Armory at Kingsbridge Road and Jerome Avenue. The seventy-odd different makes of trucks, and more than seventy-five of accessories of every kind laid out on a linoleum-covered concrete floor, 300 by 600 feet, without a post to obstruct the view, under a bunting-hung ceiling 110 feet high, made an impressive spectacle.

Simultaneously with the opening of the Truck Show the passenger car show opened in Grand Central Palace.

Never before have spectators at a show been able to see one-quarter as many as the number of trucks displayed at the Armory, without going from building to building or floor to floor. No posts obstruct the view at the armory, a feature to be found in halls and buildings less than half its size. The steel uprights that support the roof 110 feet above the 180,000 square feet of floor are imbedded in the rock 160 feet below the surface, where they are 12 feet in diameter.

Many of the spectators told of being surprised to get to the armory so quickly from down-town Manhattan, Brooklyn and New Jersey. When they reached the Jerome Avenue subway station just outside the armory from the Grand Central Station or Palace in thirty minutes, and from the hotels Pennsylvania and McAlpin in about forty minutes, they were delighted. Numbers of visitors praised the city for its transit facilities.

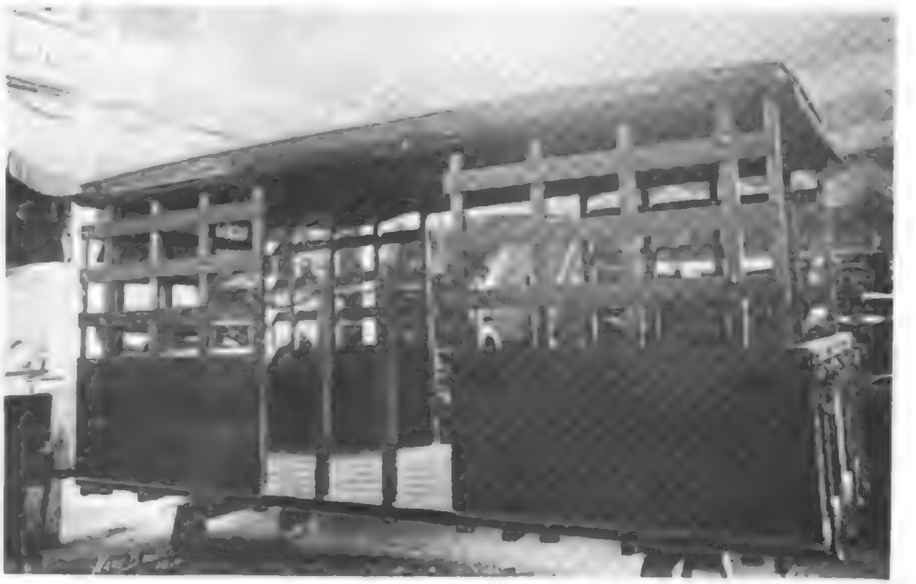
In addition to the great variety of trucks, from the smallest and nimblest-looking, to big and powerful fellows that seem capable of dragging Brooklyn bridge from its piers, there were endless different kinds of accessories and auxiliaries. There were trailers to double the capacity of the truck's motor; jacks, a thousand ingenious contrivances, shown by more than seventy-five individual exhibitors. Nothing so comprehensive as this show was, from every angle, has ever been seen before in automobile history.

The doors opened at 2 o'clock and at 3 o'clock motion pictures were shown on the main floor of the huge show-room. Among the scenes thrown on the film was that of a baby tank in action at the French front, which interested the spectators intensely. Other pictures depicted trucks in action in commercial and industrial America, including camera studies of tires and other accessories under conditions of actual usage. These were of particular interest to the truck owners and operators who attended the show to learn all they could of profitable truck operation.

The formal inaugural session of the Highway Transport Conference of national authorities on trucks and transportation was held on the opening evening, when speakers of note gave their opinions of the great significance to the nation of motor trucks and highway transportation.

Some of the speakers who were heard during the Highway Transport Conference by visitors to the big truck show were Dr. P. P. Claxton, Commissioner of Federal Bureau of Education; Hon. Grover A. Whalen, Commissioner of Plan and Structures of New York City; F. W. A. Vesper, President, National Automobile Dealers' Association; F. G. Thompson, State Highway Engineer of New Jersey; Prof. Arthur H. Blanchard, in charge Highway Engineering and Transportation, University of Michigan; Ray Sherman, Editor of Motor World; James E. Boyle, Extension Professor of Rural Economy, Cornell University; S. M. Williams, Chairman, Federal Highways Council. Several manufacturers' officials and engineers read papers, started or joined in the discussions following addresses.

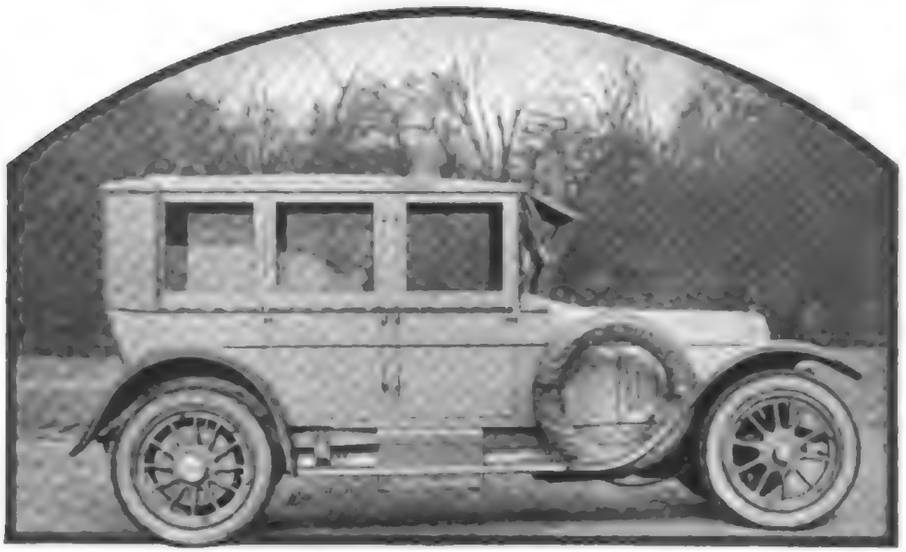
Truck experts, owners and operators who were present were greatly interested in observing that no marked departure from standard engineering practices were to be seen in the models exhibited.



A MULHOLLAND INTERCHANGEABLE BODY, AT THE NEW YORK TRUCK SHOW.

The Mulholland Interchangeable Body, made by The Mulholland Co., Dunkirk, N. Y., was exhibited at the New York Truck Show, where it attracted much favorable comment and a large amount of desirable business. The exhibit was in charge of the New York distributors, The Truck Body Corporation, of which C. B. Harris is president.

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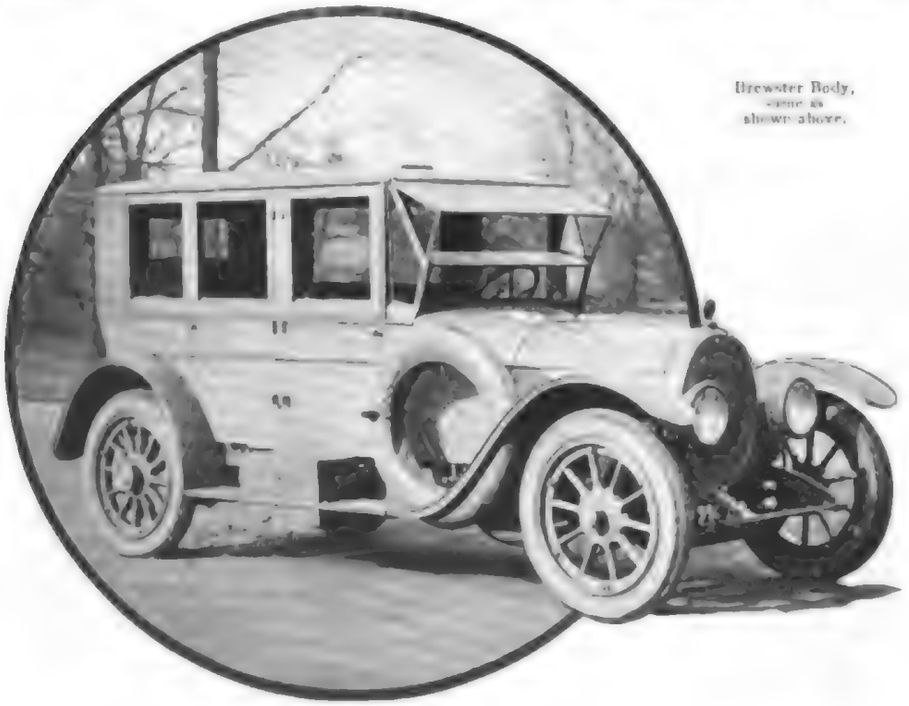
BREWSTER DOUBLE ENCLOSED DRIVE BODY.

This body is mounted on a Brewster chassis. Straight-line design. New style angular windshield, with sun shade. Division has window that can be lowered, making single or double compartments as desired. Interior in skeleton finish, upper parts painted to match cloth. Lower parts blue. Outside painted two shades of gray, oil finish, with light blue striping. Body and chassis by Brewster & Co., Long Island City, N. Y.

To judge from conversations heard at various points on the big floor, the experts who prophesied a more than ordinary interest on the part of the general public in trucks and transportation progress were right. One of these authorities had said that "the show is not an argument or an advertisement for truck transportation; such an appeal is no longer necessary. As a basic factor in twentieth-century industry and transportation the truck is here and here to stay."

The veteran manager of the truck and passenger car shows was S. A. Miles. He was assisted by M. L. Pulcher, Federal Motor Truck Co.; A. J. Whipple, Diamond T Motor Car Co., and David Ludlum, of the Autocar Company.

Following is a list of the makes of trucks that were exhibited: Acason, Acme, Ace, Armleder, Atterbury, Autocar, Bethlehem, Brockway, Clydesdale, Commerce, Corbitt, C. T., Day-Elder, Defiance, Denby, Diamond T, Dodge Brothers, Dorris, Federal, F. W. D., Garford, Gramm-Bernstein Graham, Huffman, Hurlburt, Indiana, International, Jackson, Jumbo, Kelly, Kissel, Koehler, Maccar, Master, Maxwell, Nash, Oldsmobile, Oneida, Packard, Paige, Pierce-Arrow, Rainier, Reo, Republic, Rowe, Sandow, Sanford, Schact, Schwartz, Selden, Standard, Sterling, Stewart, Sullivan,Tower, Trailmobile, Transport, Three Point, Triangle, Union, Velie, Vim, Walker, Walter, Ward, Ward La France, Wilson, Winther, Keystone.



Brewster Body, same as shown above.

Trailer Association Elects Officers

At the first annual meeting of the Trailer Manufacturers' Association of America, held Thursday, January 8th, at the new headquarters in Grand Central Palace, the members elected J. H. Fertig president to succeed W. E. Ferris, and C. H. Martin to succeed C. A. Geiger. H. C. Freuhauf and J. C. Endebrock were re-elected first vice-president and secretary-treasurer, respectively. J. H. Fertig and Ike S. Byrum were elected as new members of the executive committee and W. E. Ferris, J. C. Endebrock, H. C. Fruehauf, W. R. Bonds and C. H. Martin were re-elected on the committee.

Addresses on short-haul and terminal transportation and on patent matters were delivered by C. W. Reid, of the Federal Highway Council, Washington, and R. A. Brannigan, of the National Automobile Chamber of Commerce, New York. A paper on advertising by H. Colin Campbell, of the Portland Cement Association, was delivered by Mr. Price, of the New York office of the Association.

The Trailer Association voted to apply for membership in the Chamber of Commerce of the U. S. A. and in the Federal Highway Council.

The desirability of standardizing the load rating of semi-trailers and pole trailers was agreed upon and the general manager was instructed to secure the views of all members as to the best method.

It was voted to be the sense of the meeting that it was desirable to adopt a suitable slogan and emblem to be used by the association and individual trailer manufacturers in their advertising, on their stationery, in their catalogs and on their products.

Work of the past year was reviewed and it was decided to continue activities in 1920 along the same lines and on the same basis. The May meeting will be held in Detroit and the September meeting probably in Cincinnati. Trailer companies were represented at the meeting as follows:

Arcadia Trailer Corp., Newark, N. J., by J. H. Fertig.

Detroit Trailer Co., Detroit, by W. R. Bonds and Lewis B. Moore.

Fruehauf Trailer Co., Detroit, by H. F. Fruehauf and J. D. Rosenbaum.

Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kansas, by H. W. Perry.

Highway Trailer Co., Edgerton, Wis., by E. L. Moorman and Frank M. Lee.

King Trailer Co., Ann Arbor, Mich., by H. F. Wardwell.

F. P. Lyons Iron Works, Manchester, N. H., by J. A. Methot.

Northway Trailercar Co., E. Rochester, N. Y., by H. B. Wyeth.

Ohio Trailer Co., Cleveland, by W. E. Ferris.

Shadbolt Mfg. Co., Brooklyn, N. Y., by W. O. Shadbolt.

Trailmobile Co., Cincinnati, by J. C. Endebrock and Henry M. Wood.

Warner Mfg. Co., Beloit, Wis., by Max Herrmann and M. A. Potter.

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Trailer Displays at the New York Palace

Various types of truck trailers in a dozen different models are displayed by five trailer manufacturers in the free permanent exhibition on the seventh floor of the Grand Central Palace.

They include the light two-wheel and four-wheel trailers of 1000 to 2000 pounds capacity to be drawn by passenger automobiles and semi-trailers, four-wheel trailers and pole trailers up to six tons capacity, to be towed by motor trucks.

The Ohio Motor Vehicle Co., of Cleveland, which recently changed its name from the Ohio Trailer Co., is showing three two-wheel trailers in different capacities, fitted with platform, express or flareboard, and removable cattle-rack bodies. A three-ton reversible, four-wheel trailer chassis is also exhibited as the latest product of the company.

Automobile owners having comparatively light hauling to do will be interested in the one-ton Hi-Speed four-wheel trailer shown by the Hi-Speed Trailercar Mfg. Co., of East Rochester, N. Y. This is built especially for use with runabouts and touring cars and has ball-bearing axles and pneumatic tires. It is fitted with a low express type body with flareboards. Both front and rear end gates are hinged to permit of hauling lumber, poles, and other long material.

Besides a new reversible four-wheel trailer of three tons capacity, with stake and rack body, the Martin Rocking Fifth Wheel Co., of Springfield, Mass., is making a display of a new farm tractor of caterpillar type, designed by C. H. Martin, a pioneer in the tractor line, who designed and built the first special road tractors regularly sold in this country. His exhibit includes also three sizes of the rocking fifth wheels which are used by many trailer manufacturers and which are entitled to the credit for making the semi-trailer a success in highway transportation work. Other trailer parts shown are two rear end assemblies consisting of wheels, axles, springs and tires and three sizes of axles with hubs having bronze floating bushing bearings.

Three different types of trailers are shown by the Fruehauf Trailer Co., of Detroit. One is a semi-trailer of six tons capacity fitted with stake and rack body and supported at the front by a pair of hinged jacks that can be operated simultaneously by one man standing at the side and turning a handle or crank. The four-wheel reversible trailer brought out last year by the company is exhibited in the five-ton size, with stake and rack body. The third model is a four-ton two-wheel pole trailer fitted with bolsters for hauling telephone poles, timbers, steel girders and other very long, heavy articles.

The reversible four-wheel trailers exhibited by the Detroit Trailer Co., of Detroit, embody many interesting features of construction, chief of which is the swivel drawbar and special steering connections. A three-ton model is shown in the chassis and a five-ton size fitted with stake and rack body. Another type displayed is a two-wheel pole trailer of four tons capacity fitted with bolster.

Visitors to the trailer section of the International Tractor, Trailer and Farm Implement Exchange in the Palace can get much interesting information about trailers and their uses and economy in general at the permanent office of the Trailer Manufacturers' Association in the northwest corner of the seventh floor.

During the week of the automobile and motor truck show, the Trailmobile Co., of Cincinnati, and the Warner Mfg. Co., of Beloit, Wis., are exhibiting their latest models in the Eighth Coast Artillery Armory in the Bronx, where the truck show is held.

The most notable feature of the Trailmobile display is the brand new semi-trailer which is an addition to the line of four-wheel trailers heretofore made by the company. The automatic coupling fifth wheel, which is an exclusive Trailmobile design, enables the driver of a truck to couple and uncouple the trailer without leaving his seat or being assisted by another man. The rear end of the truck is simply backed under the semi-trailer and the front end of the trailer is lifted and the fifth wheel couples automatically. The jacks under the trailer do not have to be raised by hand. The company's four-wheel reversible and non-reversible four-wheel models in light and heavy sizes are also displayed.

The Warner company's line embraces two-wheel trailers of 1250 and 1500 pounds capacity, four-wheel reversible and non-reversible trailers from 1½ to 7 tons capacity, semi-trailers from 2½ to 11 tons capacity and two-wheel adjustable pole trailers from 1¼ to 5½ tons capacity. The steering mechanism of the four-wheel type is noteworthy for the way in which perfect alignment of the wheels is maintained and any tendency to weave, wobble or sidesway when running is prevented.

Establish Eastern Center for Trailers

An industrial movement reflecting a high degree of competitive co-operation has just been accomplished by the Trailer Manufacturers Association of America, through whose efforts a central location has been created in New York City for the display of trailers and the furnishing of general information regarding the industry and the use of trailers.

Together with a number of its members, the association has taken office and exhibition space aggregating about 5,000 square feet in the International Tractor, Farm Implement and Trailer Exchange, in Grand Central Palace. In this group are included all but three or four of the members having branch offices, distributing agencies or dealers in New York. All the latest models manufactured by the following companies will be displayed permanently on the seventh floor of the building: Detroit Trailer Co., of Detroit; Fruehauf Trailer Co., of Detroit; King Trailer Co., of Ann Arbor, Mich.; Martin Rocking Fifth Wheel Co., Springfield, Mass.; Northway Trailercar Co., East Rochester, N. Y.; Ohio Motor Vehicle Co., of Cleveland; Rogers Brothers Co., Albion, Pa.

Several other members are considering joining this group and several companies not yet members of the association contemplate applying for membership and installing displays in the Exchange.

This will be a great convenience to business houses in the metropolitan district and to visitors from all parts of the country and from foreign countries who desire to investigate the subject of trailers and to make purchases. Here they will find displayed many makes, types and sizes of trailers, and representatives will be on hand to give all the information desired. This will save visitors the trouble of looking up the various offices of trailer companies and then going to warehouses or display rooms in other locations or parts of the city to see the trailers themselves. Very few manufacturers or distributors have heretofore maintained their offices and display rooms in conjunction.

Dealers and other visitors to the National Automobile Show and other industrial exhibitions to be held during the year on the lower floors of the Palace will find it easy to take the elevators and inspect the free trailer displays on the seventh floor. At the offices of the association adjoining the displays information can be secured about other makes of trailers and the economy and advantages of trailers in all kinds of haulage by highway.

General Pershing's Chauffeur

Much comment has been caused all over the country by the exhibition of General John J. Pershing's car in many cities. This Locomobile, equipped with Goodyear cord tires, was on every front during the war and also carried practically every reigning European monarch and the most famous war heroes of every country. Cæsar Santini was Pershing's chauffeur—but he has been annoyed by the claims of many others that they drove the American commander-in-chief. Santini says he left the United States with the General on the Baltic, May 28, 1917, and drove him continuously until he returned on September 8, 1919. Santini has a citation from Pershing for meritorious work and a medal from the King of Belgium.

B. A. Gramm, of the Gramm-Bernstein Motor Truck Co., Lima, Ohio, was in New York during show week. His company was one of the largest exhibitors at the show, where were displayed the complete series of Gramm-Bernstein trucks, ranging in size from 1½ to 5 ton capacities. All Gramm-Bernstein trucks are provided with a pad for attaching Gramm's basic patent power take-off, which feature greatly enhances the value of the trucks. This company was the builder of the first Liberty (U. S. A.) truck.

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The Automotive Engineers

By Coker F. Clarkson, General Manager, Society of Automotive Engineers.

The word co-operation has been overworked in many respects, but without doubt real co-operation, which means consideration of the views and interests of competent men in a given scope of work, is one of the most vital elements in modern industrialism. The world has seen no more admirable and effective example of co-operation than that of the automotive engineers.

It was their co-operative proceedings which placed the American automobile in its high rank among the products of the world. From the start the standardization achievements of these men, begun fifteen years ago, have been based on thorough study, merit and common sense. Great economy and speed of production of high-class automotive vehicles of many kinds now well known have resulted from their broad and intelligent procedure. The specific things done to this end are too numerous to mention. Briefly, there have been made available to engineers in general good specifications for materials which they must use; by elimination of immaterial differences in specifications and concentrating upon types of undoubted merit quality has been enhanced, price has been reduced and the ready securing by manufacturers and users of articles from stock supply has been made possible.

The modern use of automobiles and much other automotive apparatus would not be possible if the automotive engineers had not standardized and reduced to almost universal practice such articles as spark-plugs, screws, bolts and nuts, materials of many kinds (including, of course, metals), many features of ignition and other electrical apparatus, piston fits and piston-ring sizes, carburetor flanges, rod and yoke ends, cotterpins, lock washers, shaft fittings, test-specimens, tubing sizes, metal band and strip sizes, anti-friction bearing sizes, belt and pulley widths, flywheel housings, engine support arms, valves, fuel pipe fittings, flexible tubing, batteries, and many other things including most prominently rubber tires. The Society of Automotive Engineers has established nearly three hundred distinct mechanical and material standards, specifications, mounting dimensions of parts and accessories, and the like. And the work has only begun. Design and improvement thereof in automotive apparatus have been in no way impeded. By simplifying the routine work of the draftsmen and the engineers the way has been opened widely for advanced constructions and those novel features which make the designer's work worth while.

Saving of money and time resulting from the existence and use of S. A. E. standards has been and is enormous. The American automotive engineers have been the progenitors of the world-wide standardization movement now so plainly seen. Wise simplification of details, which standardization is virtually important in international trade. This is appreciated keenly by those manufacturing countries throughout the world now striving to control the key industries.

The Society of Automotive Engineers has at work hundreds of representative engineers, in scores of communities, on analysis of practice and co-ordination looking to the establishment of many additional standards. Nearly one hundred additional standards are established yearly. The movement is a purely logical and evolutionary one. The Society's data sheets of standards and recommended practices are much sought for throughout the world. They have recognition nationally, governmentally and internationally, and relations are maintained by the Society with the representative bodies in its broad field of work at home and abroad.

The S. A. E. has been very active in bringing together the necessary bodies in procedure to alleviate the internal-combustion engine fuel problem. It has published a large amount of basic data pertinent in this connection, as well as descriptions and discussions of specific apparatus intended to improve conditions in the burning of present-day gasoline in engines. It has had the co-operation of the United States Bureau of Mines, National Bureau of Standards, and the United States Geological Survey, and the Smithsonian Institution. The National Automobile Chamber of Commerce has appointed a Conference Committee, as has the National Petroleum Institute. The Automotive Fuel Committee, representative of the manufacturing associations and the Government bureaus most concerned, was organized through the efforts of the Society; and the S. A. E. Committee on the utilization of present fuels in engines of current types has done valuable work.

The logic of the formulation of engineering standards being conducted jointly by the S. A. E. for the passenger car, the motor truck, the farm and the military tractor, the motor-boat, the aeronautic and the farm engine and isolated electric lighting plant industries, is that a very large portion of the work that the S. A. E. has done and is continuously carrying forward is exactly that which is best for all these industries. The S. A. E. has an experienced, well-equipped and highly successful staff and organization, and there is no manner of doubt that it is sensible and fundamentally important that all engineers engaged in work based on the internal-combustion engine, within the scope of activity of the S. A. E., to proceed together in this collection and analysis of data for the purpose of establishing standards of those things which not only can be, but should be, the same, to secure as many as possible of the innumerable economies and short-cuts which are entirely feasible, do not sacrifice but enhance quality, and are essential in modern competitive trade. The automobile engineers, who are now engaged in the various automotive fields, developed the modern internal-combustion engine to its present high estate, the materials for it as well as for its chassis, and largely the requisite greatly refined machinery with which these are produced.

The Society of Automotive Engineers does not restrict its standards procedure to pure engineering matters. But it is clear that some questions with which automotive engineers are connected intimately can be handled effectively only through really commercial action and considerations. All engineering standards must naturally be supported by manufacturing interests before they can be reduced to the desired extent of practice. It is obviously much wiser then for an engineering organization to devote its attention to engineering phases for the most part, as a matter of efficiency, leaving the commercial considerations almost entirely to trade and manufacturers' associations as such. Examples are commercial, as distinguished from engineering, ratings of performances. The horsepower rating formula commonly known as S. A. E. has never been adopted by the Society of Automotive Engineers.

The S. A. E. committees regularly make sincere effort to simplify conditions of design and production whenever a plausible specific suggestion is made. In many cases, however, it appears upon preliminary analysis that it is not feasible or wise to endeavor to establish a standard or a recommended practice of a particular element. It is a maxim that to get standards accepted, they must be acceptable. It is the policy of the S. A. E. to not take positive action by way of standards recommendation unless it be clear by largely preponderating majority vote that a good and proper purpose will be served. In the formative stage of any development such action is most likely to be premature and ineffective. Standardization is not a thing to be forced at all unduly.

A further basic principle of standardization work is that the personnel in immediate charge of subjects in a given field shall be adequately representative of good and the best engineering knowledge and practice in that field. The membership of the S. A. E., which includes over four thousand men in this and other countries, gives practical working effect to this principle. In addition the Society proceeds upon the broad basis of working jointly with other bodies, in adherence to the general policy of co-operating whenever there is reasonable prospect of arriving at the main result to be desired—good, helpful, mechanical standards, material specifications and shop practices for those great leaveners of civilization—the automotives. The basis of modern life, including the phase of war, is in large part transportation. The automotive engineer is dedicated to transportation, governmental and civilian.

Stevens-Duryea Back Again

The Stevens-Duryea car, which had not been in production since the beginning of the war, was again in evidence at the New York show. A large output of Stevens-Duryea cars is planned and increased facilities, to be provided for by a new plant at Chicopee Falls, Mass., will soon be under way. These factories will probably bring back many of the old department heads and workmen who had become trained in the exacting requirements of this car's production.

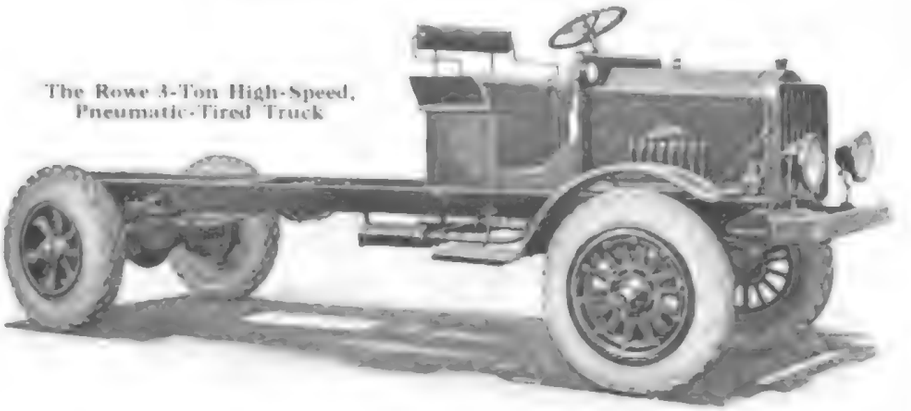
Rowe
THE PIONEER WORM-DRIVE TRUCK

A GREAT NAME FOR SERVICE the Rowe Truck has gotten unto itself. And that's one of the particular reasons why dealers should consider handling this wonderful truck.

You will realize just how wonderful it is when you read the expressions from owners given on next page.

ROWE MOTOR COMPANY
LANCASTER, PENNA.

The Rowe 3-Ton High-Speed, Pneumatic-Tired Truck



ROWE RUNS RIGHT

ROWE RUNS RIGHT

The Rowe's Efficiency Attested by Its Owners

After looking over the following opinions you will know why Rowe dealers have no trouble in securing repeat orders

PURCHASED 6 TRUCKS IN 13 MONTHS

"We wish to say right here, as an example of our maintenance outside of magneto adjustments, the last truck we purchased has not had a cent spent on it for repairs.

"It's a very useful unit in our business, and for all-around usefulness has proven the best. We have nothing but praise for our Rowe trucks.

"The purchase by us of six trucks in 13 months speaks for itself, and we feel justified in putting our stamp of approval on this make."

ENGINE REPAIRS NEVER NEEDED

"I am glad to be able to say that it is in use every day and giving entire satisfaction. It has never been necessary to repair the engine in any way, which I consider some record, when you take into consideration the heavy loads of ice which it is continually hauling over country roads, some of them not much better than plowed fields."

ALWAYS HAVE PLENTY OF POWER

"We have in use in our lumber yard two Rowe trucks five-ton capacity each. We have been running one of them continually since 11th mo. 12th, 1917 and the other since 3rd mo. 7th, 1918.

"They have proven themselves to have no lack of power for the heavy loads we have put on them, and have stood up for the work to our satisfaction."

PAID FOR ITSELF WITHIN 2 YEARS

"My original investment was repaid to me within the first two years.

"Have collected nearly $1,000.00 from other truck owners, whose hauling I finish after their trucks become disabled on trips.

"The Engine, Clutch and Transmission Gears in my truck today seem to be as good as new, after nearly 20,000 miles travel over the hilly grades in Cincinnati and surrounding territory.

"Your make of Worm Drive Truck seems to be independent of all so-called service stations, which proves its merit throughout."

We would be pleased to refer you to writers of the above, as well as to many other satisfied Rowe truck users

ROWE MOTOR COMPANY

LANCASTER, PENNA.

Rowe 5-Ton Truck

View on opposite page shows body in dumping position



ROWE RUNS RIGHT

ROWE RUNS RIGHT

The Remarkable Records of the Rowe Are Due to Its Remarkable Construction

Note these specifications:

ENGINE—On pneumatic 3-Ton Model, 50 H. P. Herschell Spillman. On other models, 4-Cylinder Wisconsin.

AXLES—Sheldon. Rear axle of housing type with David Brown worm gear. Worm special steel, heat treated, with hardened differential gears. Roller and ball bearings used throughout.

SPRINGS—Sheldon. Rear, semi-elliptic type, so slung as to minimize all road shocks.

STEERING GEAR—Ross. Irreversible, of the worm and nut type.

TRANSMISSION—Brown-Lipe. Four speeds forward and one reverse. Gears special triple heat treated.

IGNITION—Bosch high tension magneto.

CARBURETOR—Zenith

ROWE MOTOR COMPANY

LANCASTER, PENNA.



Rowe 5-Ton Truck
On opposite page body is shown in loading position

ROWE RUNS RIGHT

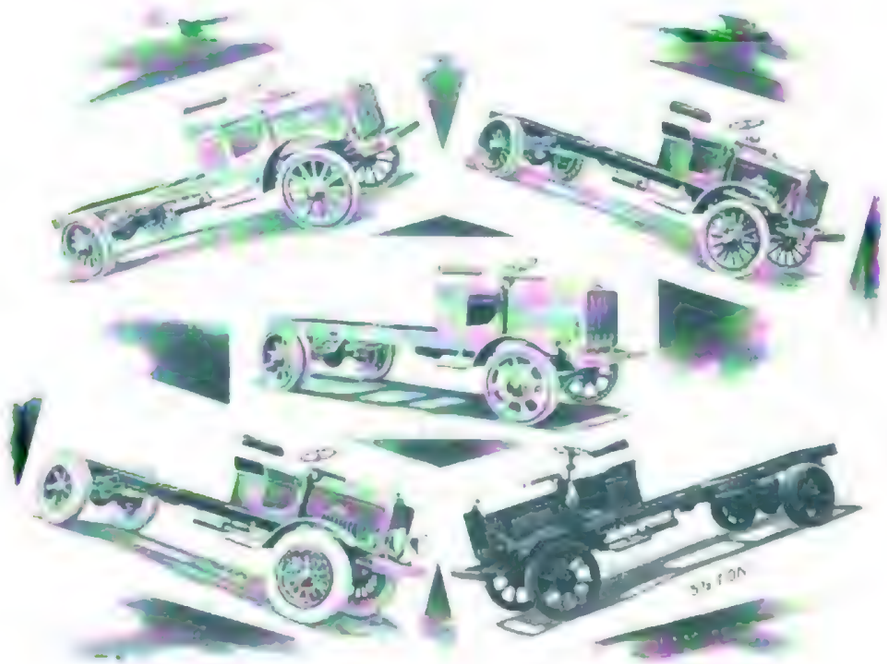
Rowe
THE PIONEER WORM-DRIVE TRUCK

Rowe Dealers Can Reach All Truck Buyers

There is a model for every service.

There is a service record back of every model. And there are territories thick with prospects ready for dealers.

A postal will bring full particulars. Send it now.



ROWE MOTOR COMPANY
LANCASTER, PENNA.

ROWE RUNS RIGHT

ROWE RUNS RIGHT

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

No. XIII.—HOW TO INCREASE THE MILEAGE OF PNEUMATIC TIRES.

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

Other things being equal, the life of any pneumatic tire varies directly with the treatment which it receives. With proper care, the life is long—running often through two seasons. A small amount of abuse may cause the life to be measured in hours.

Tire manufacturers as a whole realize the necessity of proper tire care to secure satisfactory service, and stand ready to help the tire dealer and repairman to educate the motor car driver in caring for his tires. For future sales depend upon past satisfaction, and the tire dealer realizing this and giving his customers the benefit of his experience, has paved the way to future business.



Fig. 1. Overloading: Showing the breaks from excessive loads and the severe driving strains to be expected under such conditions. The remedy is larger tires.

The following illustrate some of the results of the more common forms of tire abuse, and by avoiding these abuses, tire mileage may be greatly increased. The dealer and motor car repairman will do well to study the illustrations, and when a car owner comes in with a tire claimed to be defective, explain to him that the failure is the result of a specific oversight on his part, *and show him how he can avoid the difficulty in the future.*

The Firestone Tire and Rubber Co. list, among others, five common abuses that shorten tire life. They are: overloading, under-inflation, fabric ruptures, rut wear and oil soakage. The effects of these abuses are shown in Fig. 1 to Fig. 5 inclusive.

Overloading

It is evident that if a tire is forced out of its natural shape by an excessive load, the strain will be concentrated on some part, and eventually that part will give way. The effect of the overload is to flatten the tire, even though it be inflated to the proper pressure, and in flattening the strain is concentrated on the side walls. Repeated flattening on rotation causes the side walls to break down, in the manner shown in Fig. 1.

The tendency on the part of owners in such cases is to state that the tires were inflated to proper pressure, and that they drove carefully, hence the failure was the result of a defect. Tire manufacturers provide a table showing the load any one of their tires is supposed to carry. If the load exceeds the amount listed in the table, the tire is overloaded. The remedy is to either decrease the load, or put on oversize tires if a decrease in load is impossible.

A table of permissible load for various sizes and types of Firestone tires follows, and subsequent to that is a table of oversize tires. (See next page for table.)

A rough rule to follow is that front tires should be inflated from 15 to 18 pounds per inch of tire section, and rear tires should be inflated from 15 to 20 pounds per inch of tire section.



Fig. 2. Under-Inflation: This tire was ridden soft and in passing over rough places the rim caused beads to bend down, chafing and bruising the fabric.

The results of running on under-inflated tires is shown in Fig. 2. When soft, the tire runs against a wave in the tread rubber which will from excessive stretching or heating pull away from the tire body. This pulling apart of the layers extends through the tire.

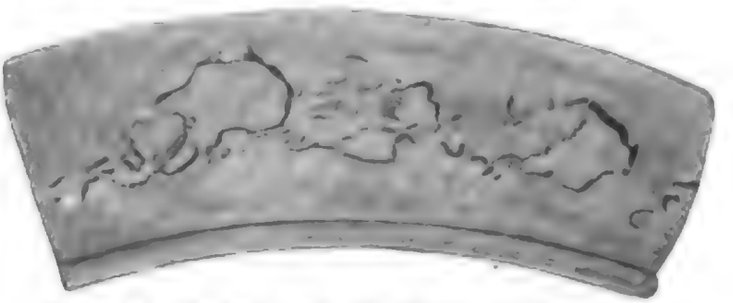


Fig. 3. Snag and Rut Wear: Side wall rubber and several plies of fabric worn away by rut wear, grinding against curbs, etc.

Under-Inflation

Under-inflation produces about the same results as overloading, but the cure in this case is somewhat more simple—consisting of inflating the tire to the proper pressure. The preceding table will indicate the correct pressure for any tire, though each maker recommends for his tires a pressure that may vary slightly from these, and if the maker's table is available it should be used.

The popular impression that tires should be run softer in hot weather is to a great extent a fallacy. A tire inflated to 60 pounds at 60 degrees, and then heated to 80 degrees will show a pressure of 63 pounds, and this increase is not dangerous.

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Tires should be inflated to the pressure recommended by the manufacturers, and a gauge used to determine when that pressure is attained. If at that pressure the car is found to vibrate excessively, or the rear wheels slip, a slight amount of air may be removed. The resulting pressure at the point of satisfactory operation should be noted, and the tires subsequently inflated to that pressure.

CARRYING CAPACITIES FOR FIRESTONE FABRIC TIRES PER WHEEL

Inflation Pressure	3"	3½"	4"	4½"	5"				
40 lbs.	350	...	...	....	....	....	....	....	....
45 lbs.	375	...	...	....	....	....	....	....	....
50 lbs.	400	535	...	....	....	....	...	....	....
55 lbs.	...	570	735	....	...	...	....	....	....
60 lbs.	...	600	775	....	...	....	....	....	....
65 lbs.	...	630	815	....	....	....	....	....	....
70 lbs.	....	...	840	1045	....	....	....	....	....
75 lbs.	...	...	865	1100	1250	....	....	....	....
80 lbs.	...	...	...	1180	1300	....	....	....	....
85 lbs.	...	...	...	1255	1370	....	....	....	....
90 lbs.	...	...	...	1430	....	....	....	....	...

CARRYING CAPACITIES FOR FIRESTONE CORD TIRES PER WHEEL

Inflation Pressure		3½"	4"	4½"	5"	5½"	6"	7"	8"
50 lbs.	...	600	...	....	....	....	....	....	...
55 lbs.	...	640	825	....	....	....	....	....	...
60 lbs.	...	675	875	....	....	....	....	....	....
65 lbs.	...	710	915	....	....	....	....	....	....
70 lbs.	...	...	945	1175	....	....	....	....	...
75 lbs.	...	...	975	1240	1405	..	....	.	
80 lbs.	...	...	...	1330	1460	1640	....	....	
85 lbs.	...	...	...	1415	1540	1725	2115	....	....
90 lbs.	...	...	...	....	1610	1800	2190	....	....
95 lbs.	...	..	...	....	....	1870	2300	2780	....
100 lbs.	....	...	...	....	....	....	2360	2850	....
105 lbs.	...	...	...	....	....	....	....	2930	3580
110 lbs	...	...	...	....	....	....	....	3060	3700
115 lbs.	...	...	...	....	....	....	....	....	3830
120 lbs.	...	...	...	....	....	....	....	....	3970

OVER SIZE TIRE TABLE*

If now using tires of following sizes	These larger sizes will fit same rims	If now using tires of following sizes	These larger sizes will fit same rims
30 x 3	31 x 3½	32 x 4	33 x 4½
30 x 3½	31 x 4	34 x 4	35 x 4½
32 x 3½	33 x 4	36 x 4	37 x 4½
34 x 3½	35 x 4	34 x 4½	35 x 5
		36 x 4½	37 x 5

* Michelin

Rut Wear and Snags

The results of rut wear, snags and curbstone wear is illustrated in Fig. 3. Wear of this kind usually occurs on the outside of the tire—that is, the side away from the car.

This wear may result from necessary driving over rough or rutted roads. In this case the remedy is to be as careful as possible, and to reverse the tires at frequent intervals so that the wear will be distributed. At the time of reversing the tires, any cuts or abrasions should be repaired, so that water, sand and grit cannot work into the fabric.

The side walls of the tire are of necessity flexible, and somewhat softer in composition than the tread. Hence they will not resist wear as well as the tread. Driving too close to curbs is a frequent cause of side wear.

Fabric Rupture

There is frequently misunderstanding on the part of the car driver as to the cause of fabric ruptures, as it is popularly considered that a fabric rupture is the result of a structural defect. This *may be*, but usually is not the case. A fabric rupture, such as shown in Fig. 4, is usually started long before it is noticed, and is caused by breaking of a few threads of fabric through a severe bump, bruise or small cut.

Overloading, under-inflation, speeding over bad roads, neglected cuts, or about any of the common tire abuses may result in fabric rupture, and the remedy is to stop the abuses and inspect the tires at frequent intervals, repair small cuts, and inspect the interior to see if weak places are developing. Such weak places should be reinforced by a blowout patch or vulcanizing.

Effects of Oil and Grease

Gasoline, oil and grease dissolve rubber—and their continued presence on a tire will cause the various layers to soften and separate, as shown in Fig. 5 on page 21.

One of the greatest sources of grease, directly causing tire deterioration, is leakage of grease and oil from the differential housing and brake drums onto the tires. It lodges on the inside face of the tire, where it is not particularly easy to see or clean off. And by remaining, the condition shown in Fig. 5 is approached.

The remedy is to repair the leak—whether it be caused by loose bearings, worn packing, too much or not suitable lubricant. And the tire should be carefully cleaned with gasoline. It was stated that gasoline was a solvent of rubber, but it evaporates so quickly that small quantities for short periods is not harmful.

The car should likewise never be allowed to stand in a pool of oil in a garage. The garage floor should be kept as free from oil as possible, either by the use of drip pans or by frequent scrapings. A tire which has been oil soaked, in addition to quick disintegration, cannot be vulcanized, as attempted vulcanizing will simply result in blistering.

The Michelin Tire Co. list stone bruises, violent braking and chafed tires as important items in the tire maintenance group. A stone bruise is ordinarily not apparent from the outside of the casing, and only becomes evident after the fabric has broken, resulting in a pinched tube, blowout, or swelling in the tire section.

A stone bruise results in a fabric rupture, and comes from driving over rough roads with under-inflated tires, in many cases. Hence the way to avoid tire troubles of this nature is to keep the tires properly inflated, and drive carefully.

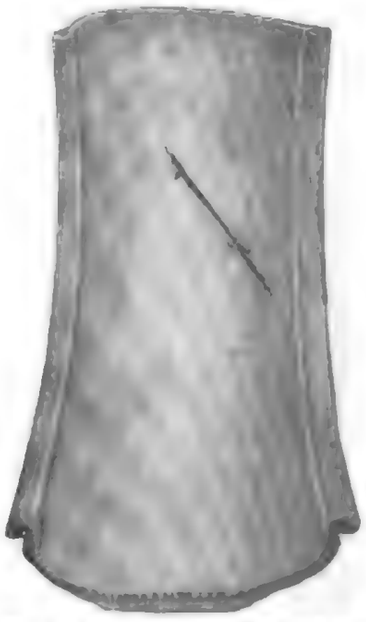


Fig. 4—A fabric rupture which may have been started long before it was noticed

Violent Braking

Application of the brakes to the point where the rear wheels cease revolving with the car still in motion has an extremely harmful effect on the tire. The tread at the point of contact with the road is ground away almost as fast as it would be on an emery wheel, and a single application of brakes in this manner may ruin a tire.

In addition to destroying the tire, violent braking does not stop the car as quickly as proper application of the brakes, and increases the tendency of the car to skid. It is often the result of improperly adjusted brakes, and if one wheel tends to lock, the brakes should be examined. The same applies to grabbing or chattering brakes.

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Chafed Tires

Projecting parts of the car often interfere with the rotation of the tire, and as a result pieces of the tread are quickly torn out, or worn away. The usual indication of chafing between some part of the car and the tire is that the injuries extend in a line around the circumference of the tire. The chafing is ordinarily continuous, and may occur only under special conditions. For example, a fender may come down in contact with the tire if the car is heavily overloaded, and driven over rough roads. Or a fender may be so bent that on rough going interference occurs. An obscure interference is that occurring only when the wheels are thrown hard over, as when turning around.

Frequent inspection of the tires and the car should show that under all conditions the tires are free to turn without interference.



Fig. 5. Effects from Oil: Showing tread which has been softened and separated from carcass of tire by oil.

Misalignment

The Goodyear Tire and Rubber Co. place misalignment first among the abuses to be eliminated in seeking tire conservation. Bumping into curbs, hitting bumps in the road, and similar strains may throw the wheels out of proper alignment, and the condition shown in Fig. 6 occurs. This causes the wheels that are out of alignment to be constantly crowding in, and slipping instead of rolling on the road. As a result the treads are quickly worn down.

The amount that the wheels are put out of alignment may not be evident without careful measurement, and measurements should be taken frequently on suspicion, and the misalignment corrected if present. The method of correcting this condition is shown in "Timesaver" No. 62, on a following page.

The above covers most of the important points in proper care of tires. The additional points to observe are to apply chains loosely so that they will creep, and not chafe the tire, and only use them when necessary; to never run on a flat tire, and to repair small cuts as soon as possible after occurrence.

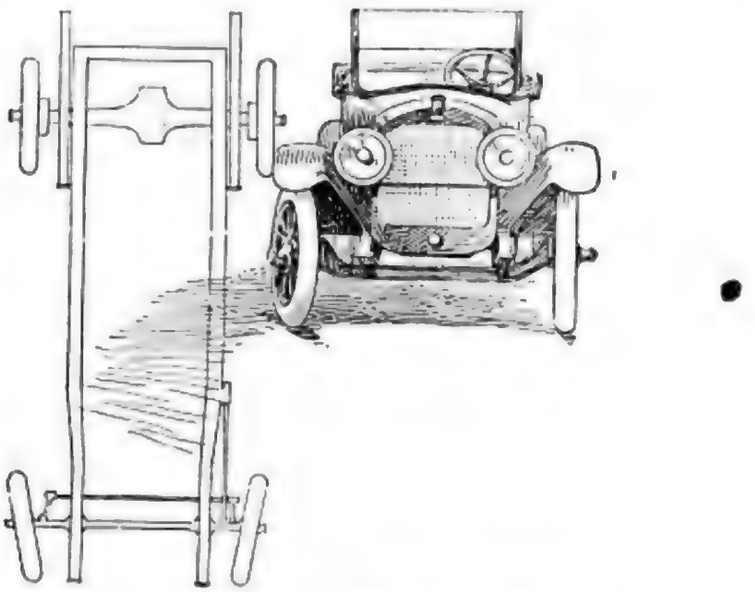


Fig. 6. When the wheels are not parallel the tread is quickly worn.

Pointers on Tube Care

Tubes suffer almost as much damage while being carried in the car as they do when in use in the tires—and more if they are not properly packed. The spare tube should be rolled up with the air valve removed; the valve replaced, and the tube carefully folded and held together by a rubber band made from a cross section of an old tube. The tube should then be packed in a cloth or fabric bag, and placed away from oil, grease and tools in the car. As stated, oil or grease destroys the rubber, and the tools may come into contact with the tubes and chafe them.

In placing a tube in the casing, either too much or too little talc is harmful. Too much talc is indicated by the collection of the talc in lumps, which after extended driving may work into the tube, and so weaken it that a blowout results. Too little talc, on the other hand, permits the tube and the casing to vulcanize together from the heat and pressure of running. On removal, the tube will stick to the casing, but it may usually be removed by the aid of gasoline.

Talc should be sprinkled freely over the interior of the casing prior to inserting the tube, and should be rubbed over the entire inner surface. Any excess talc resulting should be shaken out and the tube inserted.

Other points to watch in tube application are to see that the valve stem extends directly through the rim, and not at an angle; that the tube is not pinched between the casing and the rim, and that the flap is inserted and fits smoothly all the way around.

The Changed Veiwpoint

By Ralph Kaye, Kissel Motor Car Company, Hartford, Wis.

Due to its adaptability to practically every transportation requirement, coupled with low cost of operation and maintenance, the attitude of the motor buying public has undergone complete change toward the automobile.

While originally the automobile was referred to as a machine, it has come to be more and more regarded as a family carriage or personal carrier, exemplifying the taste and ideas of quality, character and design held by the owner.

This change has become apparent of late through the many conveniences and comforts which the automobile manufacturer has installed in his product.

It was only a short time ago that the automobile was a machine built and designed for merely machine purposes. At that time practically all of the manufacturer's attention was concentrated on mechanical parts of the automobile, devoting most of their study and experiments to perfecting the car as a speedy, reliable machine. Very little thought was given to the comfort of its occupants or even to its appearance.

The type of car dependent entirely upon its mechanical merits without regard to style and appearance is giving way to the finished motor car, designed and built for body comfort and pleasing appearance.

To produce the type of automobile wanted by critical motor car buyers of today demands that the manufacturer not only install all the modern conveniences, accoutrements and appointments especially designed for the purpose, but to adopt those features out of the usual and which have up to a very short time ago been found only on custom-made motor cars.

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"Vehicle Monthly" Time Savers

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers)

"Vehicle Monthly" Time Saver No. 61
TUBE SKIVING MITER BOX

In splicing inner tubes it is necessary to "skive" or bevel the ends prior to splicing. The miter box shown has been developed for that purpose. It consists of a narrow board screwed to the bench, and carrying a hinged channel piece that is slotted at 45 degrees, and has a slotted wooden block mounted on it. The tube to be skived is slipped over the board as shown, until the end lines up with the slot. The channel is then pressed down, the rubber knife inserted in the slot, and the tube beveled. It is of course necessary to turn the tube around that all parts of the end come successively beneath the knife.—Goodyear School of Tire Repairing, Akron, O.

"Vehicle Monthly" Time Saver No. 62
WHEEL ALIGNMENT GAUGE

The rear wheels of a motor vehicle should be parallel, and the front wheels should "toe-in" from ⅛ to ¼ in. Otherwise the treads will be worn excessively. The gauge illustrated permits the alignment of the wheels to be readily checked. It comprises two adjustable pointers, carried in a tubular base, one of the pointers being graduated in inches. To use, the pointers are raised to the height of the center of the hub caps, and locked. The device is then placed as illustrated, and the measurement between the front of the wheels taken. The measurement between the back of the wheels is then taken, and compared with the first measurement. It should be from $\frac{1}{16}$ to $\frac{1}{8}$ in. more.—Goodyear School of Tire Repairing, Akron, O.

"Vehicle Monthly" Time Saver No. 63
DRILL PRESS PUNCH AND DIE

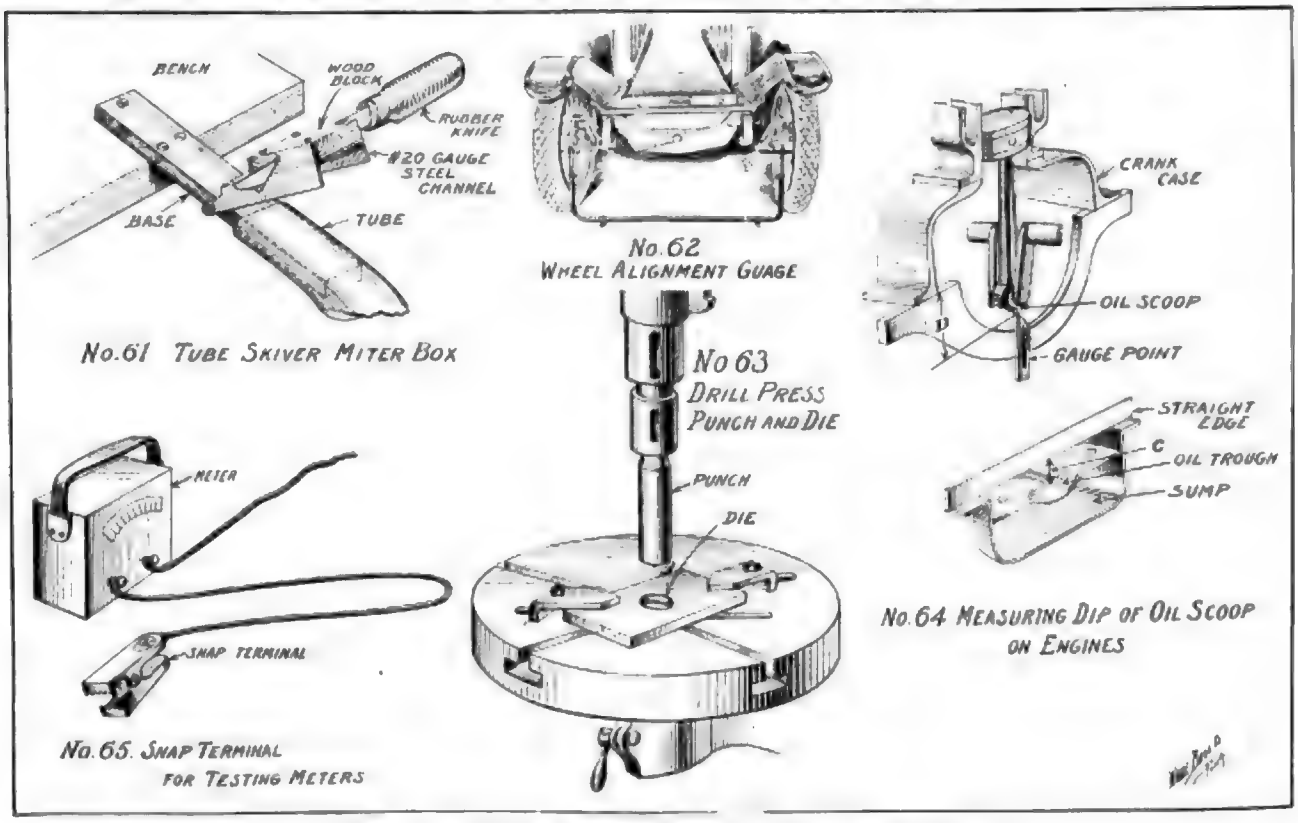
Where several holes of the same size are to be made in thin metal, fibre or composition, it will often be found easier to punch, rather than drill the holes. A drill press may be used for this work and the set-up is shown. Both drill and punch may be soft steel, but if so, it will be advisable to case harden the end of the punch.—John Slack, Philadelphia, Pa.

"Vehicle Monthly" Time Saver No. 64
MEASURING DIP OF OIL SCOOP ON ENGINES

On engines having lubrication by splash, over-oiling is frequently caused by the oil scoop on the connection rods dipping too deeply into the oil in the oil trough. The amount of dip ordinarily is about 1-16 in. for proper lubrication. This may be measured in the manner shown in Fig 64. The crank-case base is removed, and the scoops of each of the connecting rods in turn brought to the lowest point, and the distance (D) measured by the gauge. A straight edge is placed across the pan top, and the distance (C), down to the oil level measured. The gasket should be on the base when the latter measurements are made. For a dip of 1-16 in. the distance (D) should be 1-16 in. greater than the distance (C).

"Vehicle Monthly" Time Saver No. 65
SNAP TERMINAL FOR ELECTRICAL TESTING

One man conducting an electrical test on a car may find it difficult to hold his meter terminals in contact with the parts desired. This may be readily done providing all leads on his test equipment are fitted with snap terminals. These may be purchased in most stationery stores, and soldered onto the wires of the test instrument.



"VEHCILE MONTHLY" TIME SAVERS. SEE DESCRIPTON ABOVE

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Fully Equipped Motor Trucks

Paper read by Mr. A. E. Schurra, General Sales Manager of the Gramm-Bernstein Motor Truck Company, Lima, Ohio, before the National Association of Motor Truck Sales Managers, Detroit, Michigan, November 7, 1919.

I presume I have been asked to read a paper to the Association today on the subject of "Fully Equipped Motor Trucks," because of the fact that my company happens to be the first to publicly advocate that practice, though, perchance, it may not have been the first to have seriously thought of it, rather than because of any superior knowledge which they or I may have on the subject, and shall therefore attempt to treat it from that standpoint, and in doing so, give you without any bias the benefit of our experience and observations.

Let me preface all of my remarks by saying that in our opinion there is nothing new or novel in the proposition, but that instead, to our minds, there exists a real demand for what we are doing, backed by sound merchandising sense and well established precedent, all of which definitely point the way we are headed.

If you will pardon a personal allusion, I would like to take you back to 1910 when the passenger car industry was in its swaddling clothes and a state of more or less chaotic transition. All manufacturers were then groping and striving to know the wants of the market. At that time I was a motor car manufacturer on my own account, doing business in Cincinnati. Our company had been making some thousands of horse-drawn vehicles a year, and of course had some "horsey notions." That at least was what we were accused of, when we threw a bomb into the trade by being the first to announce a fully-equipped passenger car. Such equipment then included acetylene gas generator, lamps, bulb horn, top with curtains, windshield, speedometer, foot rail and robe rail.

My partner and myself were roundly berated and called all sorts of things for our stupidity in giving away so much that had previously formed the basis of extra profits, and the prediction was freely made by the wise ones in the industry that the movement would begin and end with us. However, all of you here know whether it did or not. So much for precedent.

Now I simply want to say in passing, that while the automobile sales manager did for some years plume himself and arrogate to his position a super-knowledge of marketing and as he styled it "how to put it over," I for one have never been able to see where he has taught general merchandising anything, except the two valuable features of getting advance cash deposits on future contracts, and selling his goods sight draft with bill of lading, both of which were invented, born and nurtured of necessity.

Outside of those features the nearer he has followed well-established stable ideas of merchandising, the stronger and sounder his organization has become. General sales management, to my mind, at once implies professional merchandising ability, in the exercise of which we all of us in better or poorer fashion attempt to learn what is the public demand, what is the line of least resistance in meeting that demand, and the best way to work in harmony with both.

One of the tests I like to put to any question is, "how would I like to be approached with it," as well as "will doing it in a particular way conduce to the ultimate best good of the industry."

Now, to start with, you all know that except in very isolated cases, no truck can be used without a cab of some sort, as protection to the driver, and if a cab, why not of a type which will make driving comfortable for all weathers and climates. That being so, doors, windshield and curtains are indispensably necessary.

When attending a truck owners' conference here in Detroit a year ago, one of the speakers referred to the fact that one of the greatest difficulties they had been up against was to get good drivers—that they had first tried their former teamsters, but as they were the poorest and most unreliable class of labor known, they naturally were not successful as motor truck drivers.

Someone thereupon asked why it was that teamsters were so bad, and the speaker replied that, on account of their having to be out and unprotected in all kinds of weather, it was impossible to get a man as a teamster who could do anything else.

That being so, does it not point the way to better truck drivers and consequently better results with trucks for both maker and user, if we can so equip them as to attract a higher class of help.

Now in progressing farther on the subject, let us start at the front of the truck and work back. Take the radiator guard—there are enough of these bought and paid for as extras each year to convince any one that there is a real need for them, and just to the extent that trucks multiply in number, will the need for guards increase.

The radiator of any automotive craft is, by reason of its location, character and function, a vulnerable and vital unit, hence it is only good sense to protect it from damage, not alone on account of the cost of repair but for the more urgent reason of obviating a lay-up of the truck. In fact, anything that can be done within reason to keep trucks out of the repair shop and in active service will conduce to their wider use and the greater prosperity of the industry as a whole.

The motometer is another small but valuable piece of equipment, we have found. Because by its tell-tale qualities the driver is quickly informed if he has overlooked filling up with water or oil, or if for any reason, either one had leaked away, fan belt had broken, water pump key had sheared off, oil pump or lines had broken or clogged, etc.

Under any of those conditions, motors heat up quickly, especially under heavy duty and slow running, and if conditions are not promptly relieved, scored cylinders, burned-out bearings and other serious troubles ensue.

Electric generator and lights: It seems almost needless to argue in favor of or as to the necessity of electric lighting equipment as against oil or prest-o-lite gas, because, while when Mr. Gramm first exhibited an electrically-lighted truck at Madison Square Garden in 1910, such appliances were not satisfactory and while their batteries would not successfully withstand the rough jolting of hard-tired trucks, still all of you know from your own experience that electric generators with lights are thoroughly satisfactory these days, and in fact, where trucks are driven after nightfall, especially in interurban work, there is no other form of lighting that can at all compare with it.

You would scorn the man who would try to induce you these days to accept oil or gas lights for your house or passenger car; therefore, is there any reason, since electrical lighting equipment is now made right for trucks, that you should try to palm off something passé and antique on the truck buyer, simply because you can get away at a less cost.

With the installation of electric generators and heavy duty batteries an ample supply of "juice" is assured, so there then remains no reason to equip with hard horns as against the better and easier operated electric horn. In fact, it can be easily proven that many a costly accident has been averted by the quicker and better warning given by the more modern signal.

Passing to hub-odometer, which some have argued is not a necessity, largely because they do not equip with them, may I ask how else in reason the owner may determine the mileage his various trucks make, what his cost is per ton mile for gas, oil and tires, secure proper tire adjustments, etc., or how often he should drain his crank-case in various seasons to keep his lubrication on the safe side.

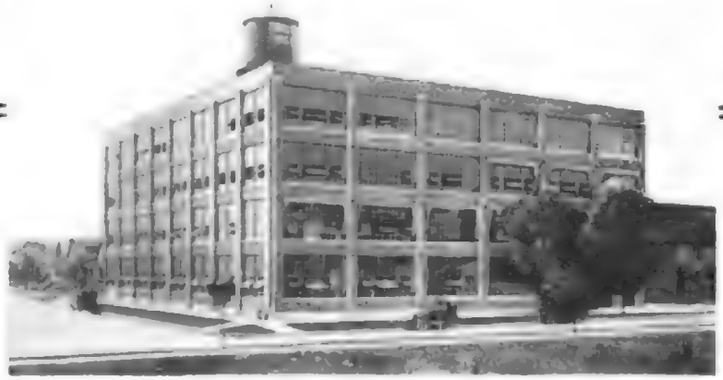
Next comes army towing hooks. I wish I could have had some of you gentlemen down at our plant a few weeks ago when one of our old chain drive, 6-cylinder trucks was being towed in from somewhere up the State, on account of a connecting rod having let go and gone through the case. It was one of the heavy duty type dumps, capable of about seven tons and consequently some load to drag along.

Needless to say, it did not have towing hooks as part of the equipment and the towing was done by means of a chain around the front cross member, while the fellow who did the towing also did not have a draw-bar, and consequently, both front and rear cross members were pulled entirely out of shape and alignment.

In the case of the dump it was necessary to not only heat and straighten out the front member but also to re-rivet the front spring brackets, as well as put in new rivets further back, where they had been started by the distortion at the front end. Needless to say that, notwithstanding the age of the old chain drive, its owner authorized towing hooks added to the repairs.

(Continued on page 54)

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View of plant where Ternstedt Closed Body Hardware is built.

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Motor Bodies and Parts

The Principles of Automobile Body Designing

BY KINGSTON FORBES, M. E.

Assistant Body Engineer, Buick Motor Car Co., Member Society of Automotive Engineers.

(This series of articles was begun in February, 1919. Back numbers may be obtained from the publishers.)

CHAPTER IV
Radiator Design

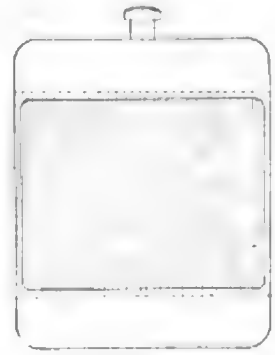
The radiator, as well as being one of the important factors that determine the lines of the car, is one of the main mechanical parts, too. Its function on the chassis should be clearly understood so that in contemplating a design the factors that govern the size and shape of the radiator will be properly considered. On the earlier design of car the radiator was designed to comply with the mechanical requirements and a shape was laid out that was considered suitable. Then the chassis was turned over to the body designer to put the body on.

With the demand for improvements this condition has been changed and in most cases the radiator shape is considered in its relation to the general design required. As the present day automobile is the sum total of all its parts, to get the final result, it is readily seen how essential it is to have a thorough understanding as to what can be done with the radiator before the new ideas are applied. There are a few cars yet that adhere to their original design of radiator. Some are retained because their original patterns happen to work out very well in the latest design, but the majority are retained because they are known trade marks of certain cars.

The object of this article is to explain the basic principle upon which the radiator design depends, and then to review the shapes and designs of the different types of radiators, past and present. If the existing shapes are known the new designs can be worked out, basing their shapes on the designer's ideas. When the various shapes are grouped together as shown in the article it will be seen that almost every possible variation of shape has already been tried and it will be at once appreciated how necessary it is to have the different shapes for reference and to study, as it will require a very thorough study before a new and original shape can be created.

Before starting a design for a radiator the mechanical and manufacturing limitations should be considered, because it would be of no use to create a beautiful design for a radiator if it could not be made or if it would not function properly. It is not within the scope of this paper to go into all the mechanical and scientific values of a radiator. Only the fundamental parts of the radiator need be considered in order to analyze the possibilities of designing or developing its general external appearance.

In order to lay out a radiator the heat dissipating requirements of the engine it is to be used with must be known. Then the type of core must be considered, as there are a number of different styles of cores and they have different relative efficiencies. Having decided upon the type of core and its efficiency being known, the frontal area can be determined. If the frontal area required by the core is too large, it may be possible to reduce the area by increasing the depth, or *vice versa*, the depth may be decreased to obtain a larger front. The larger front is the most desirable, as the efficiency per weight of material is higher than in the small front type with a greater depth. The size of the core being decided upon, the top and bottom tanks must next receive attention.



The capacities of the tanks must be within certain limits. An engine with a circulating pump can do with smaller tanks in the radiator than an engine that depends on natural circulation, or what is called the thermo-syphon system.

The mechanical construction of a radiator can be divided into five main parts, viz.: the core, the upper tank, the lower tank, the shell and the brackets that hold the shell on to the other portions. The two tanks are connected by the core which is composed of a number of tubes with radiating fins of a tubular construction that will present the greatest possible surface to the air, so that the heat of the water flowing through it will be rapidly dissipated. The tanks and core are contained in the shell and the unit as a whole is suitably attached to the car frame.

The mechanically ideal shape for a radiator would be rectangular or square. This will give the maximum capacity per weight and be the most simple to construct. In Fig. 30 is shown a simple rectangular shaped radiator. It is important to see that the radiator is designed so that it will not unduly constrict the effective size of the core and also to see that it can be made as simple as possible. To illustrate how the core's efficiency is interfered with, two radiators are shown in Figs. 31 and 32, that constrict the upper tanks so that extensions are necessary in order to get an effective number of tubes in it. It is readily seen that the cost of manufacture is greatly increased by these designs, and the number of tubes are reduced, and the efficiency of the radiator correspondingly impaired. (Figs. 31 and 32 are on page 29.)

Having studied the minor workings of the radiator, the outside or the shell can now be taken up. When the factors that govern the inside of the radiator are known it is possible to make the necessary compromise to obtain the desired external design in conjunction with the required efficiency. The outer shell of the modern radiator is made of steel and is formed to shape in dies. In the case of small quantities it is made of sections joined together, but as the production is so large even on the average cars, dies are generally made to make the entire shell from one piece of steel. This method is by far the most satisfactory, and the most economical one from the maker's point of view. To make a shell from one piece requires an immense press and large dies, and then in order to make the shells successfully the design must be governed by certain conditions that are required to make the dies work properly.

To obtain the best results in drawing a radiator shell the design should be one that will give a uniform draw all around. The best shape for an ideal draw in the dies would, of course, be circular, but a circular shell would not give an economical condition for the tanks, or the best possible efficiency of the radiator; so speaking for the average shell the design will be rectangular with an easy running top, and a full radius will be allowed at each corner; the front edge of the shell will have a radius; the sides will be 2 or 3 degrees tapering, this will allow the shell to come off the punch easily, and also come out of the die readily.

In Fig. 33 is shown a scale drawing of a good design of radiator shell. Upon looking

(Continued on page 28)

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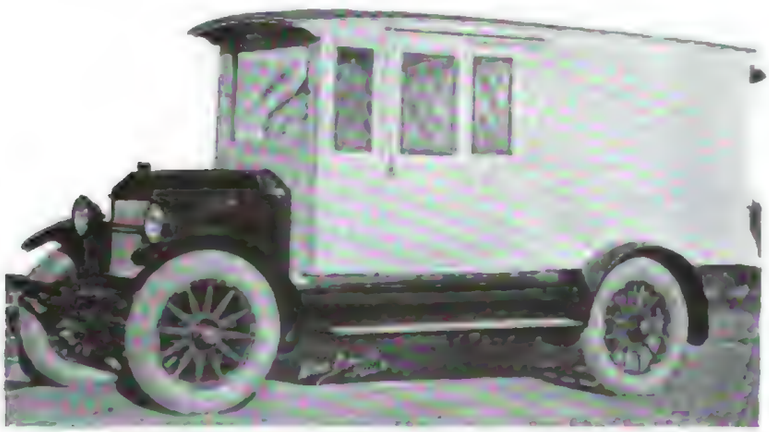
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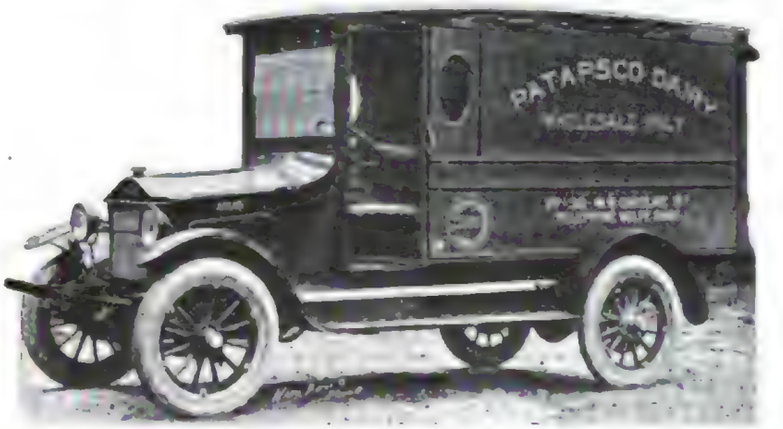
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Monument Varnish Co., Fort Wayne, Ind.
Wm. Stockhoff, Louisville, Ky.

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Principles of Automobile Body Designing

(Continued from page 25)

at the front view it will be seen that the top and bottom have good, easy curves, and the radii at the corners are large, with the sides alone being flat. In the top view is shown how the sides bevel off to the front. The section shown at A A shows the raised portion on the top of the shell for the radiator filler base to go through. This raised portion has a uniform height from the plane of the shell's taper on top.

The crowned front has an easy curve, the object of this being to stretch the metal so that there will not be any wrinkles in it and also to set the metal so that it will retain the desired shape. For the same reason all surfaces of the shall have slight crowns in them. For instance, the section B B shows the crown at the bottom of the shell. To make a shell similar to the design shown in Fig. 33 it takes seven operations, these are as follows: No. 1 blank, No. 2 draw, No. 3 trim, No. 4 2d draw, No. 5 expand, No. 6

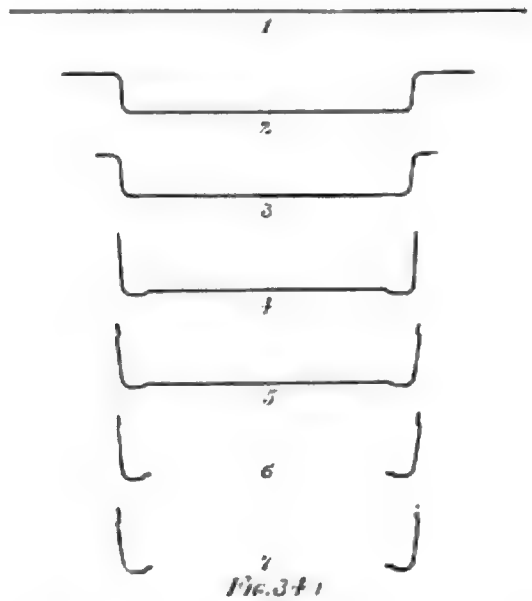


Fig. 34

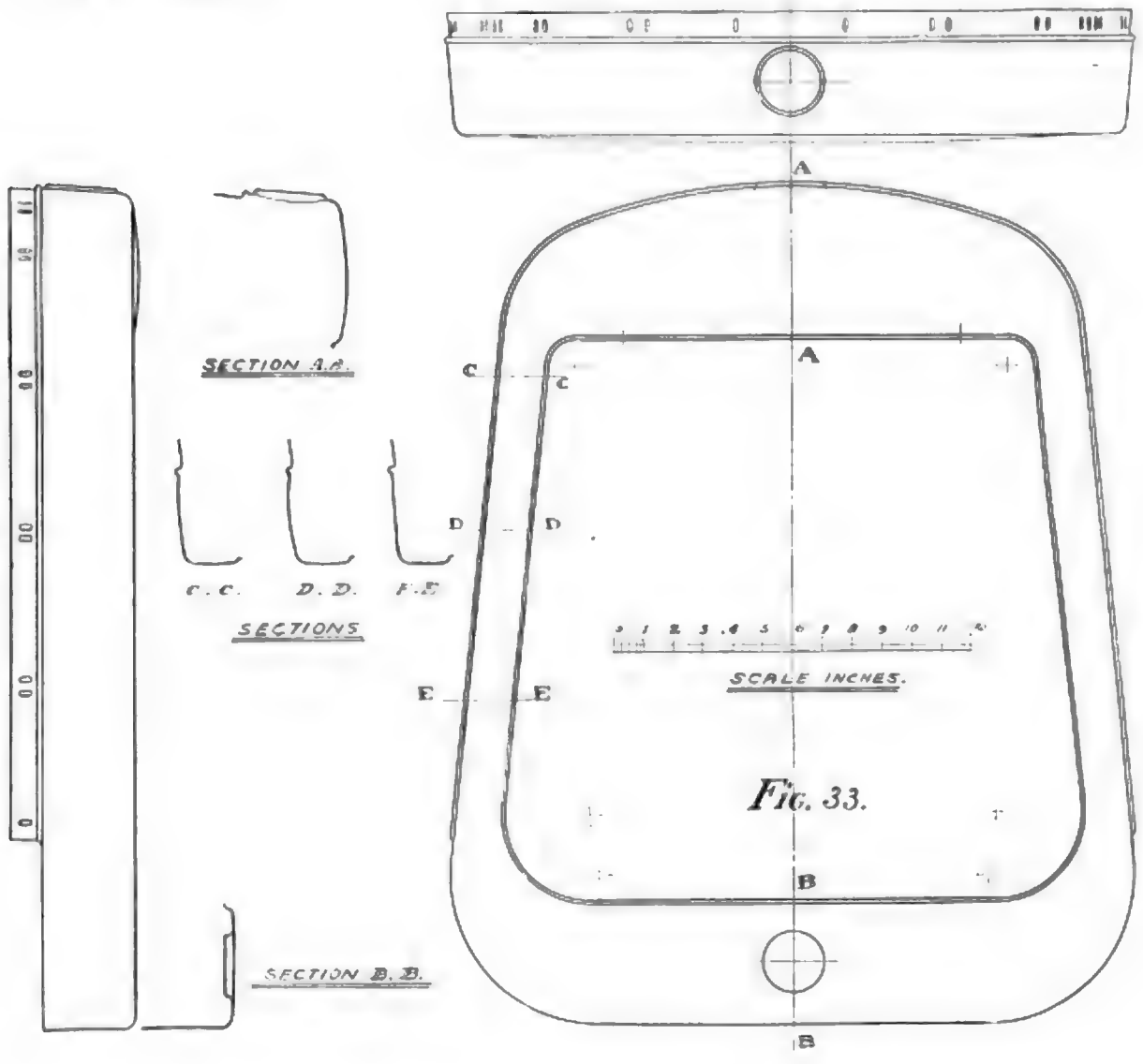
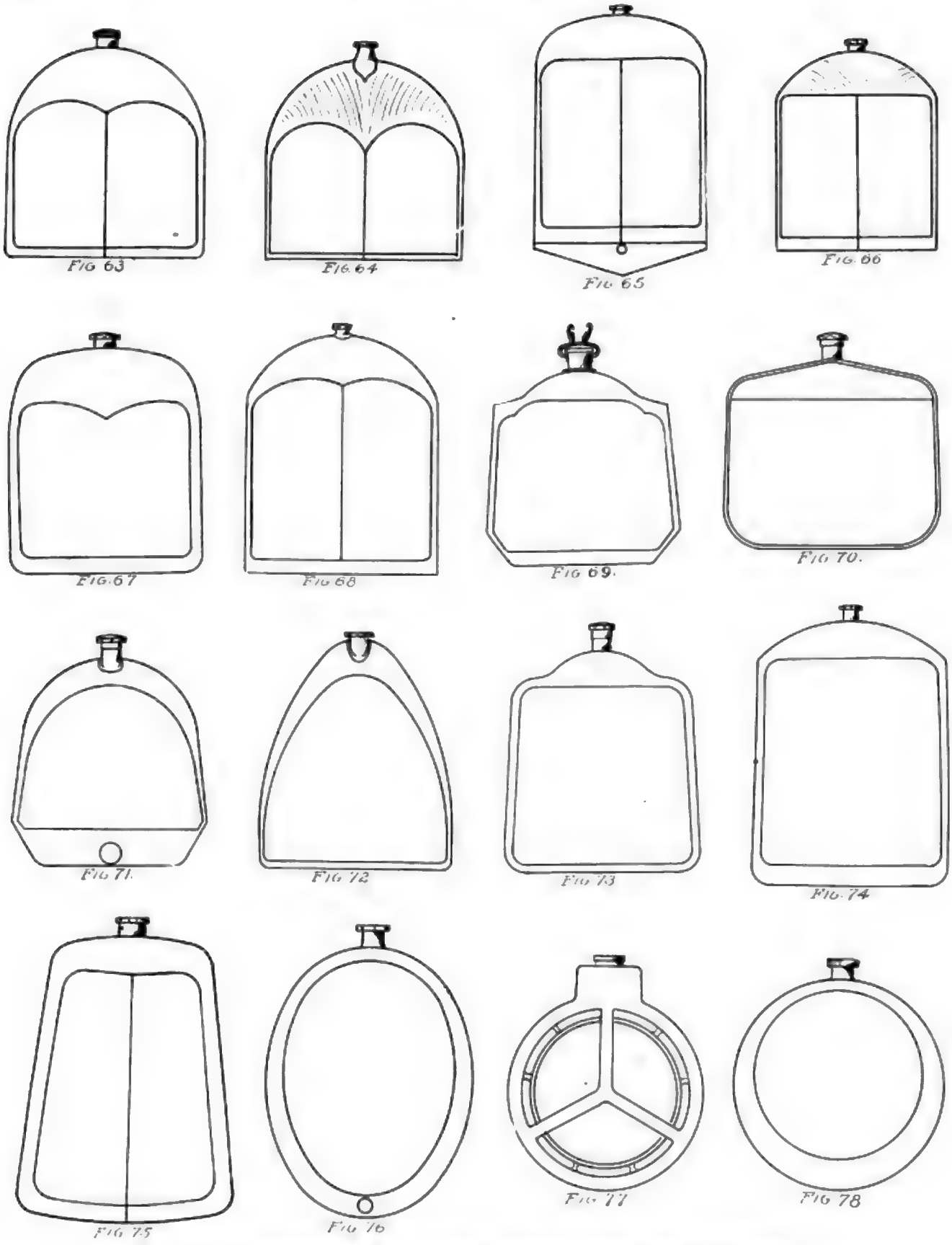


Fig. 33.

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SHAPES AND DESIGNS OF AUTOMOBILE RADIATOR FRONTS—PAST AND PRESENT

take out front, No. 7 pierce the holes in sides and top.

In sketch No. 34 is shown what the shell looks like on the second operation, and in the sections (numerals from 1 to 7) are shown the difference in the shape of the shell after each stage of its seven operations. When the fundamental principles of the radiator's construction are understood a design can be worked out that will prove satisfactory providing the different points are kept in mind and the design made accordingly. The primary condition having been studied the next problem is what shall the shape be, and in order to assist the choice of the shape the various styles of radiators have been grouped together and are shown in sketches from 35 to 84.

Eight groups have been made, the first group has been called the angular top; the second, the flat top; third, round top; fourth, flatted round top; fifth, V-fronts; sixth, miscellaneous; seventh, round and oval shaped fronts; eighth, miscellaneous foreign types. Group 5, V-fronts could be sub-divided again into two groups, the first to have sharp V-fronts and flat shaped tops and the second to have round top with V-fronts. As far as the front view is concerned the shapes are of all the types grouped from 1 to 8. The sketches show 50 different types and each one has some characteristic that the others have not, and while these do not show every type of radiator made they show the great range through which the designers have worked in to get original and desirable designs.

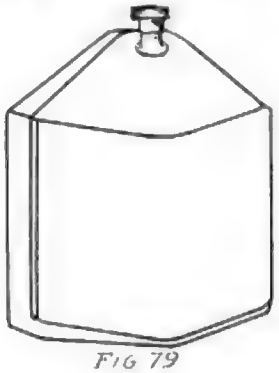


FIG 79

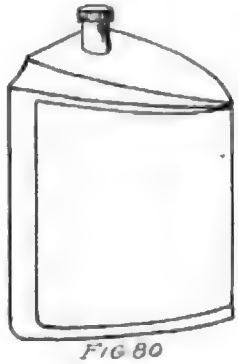


FIG 80

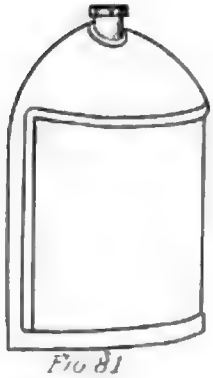


FIG 81

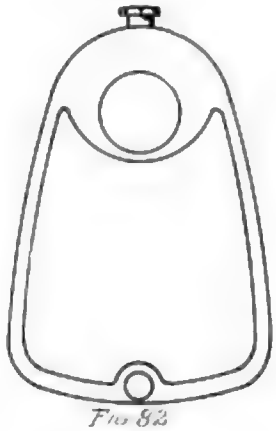


FIG 82

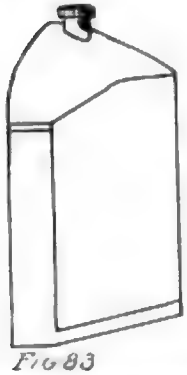


FIG 83

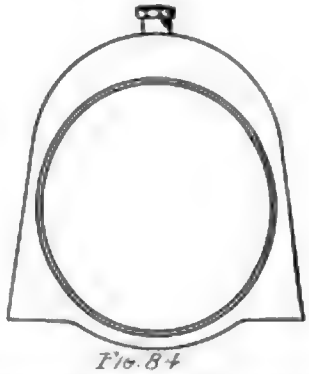


FIG 84

SHAPES AND DESIGNS OF AUTOMOBILE RADIATOR FRONTS—PAST AND PRESENT

In group No. 1 are shown sketches of the Pierce-Arrow; Fig. 35, Fig. 36 National; Fig. 37 Studebaker; Fig. 38 Stutz; Fig. 39 Chevrolet; Fig. 40 Cadillac; Fig. 41 Overland. While they are all of the same general outline not one of them could be mistaken for the other.

In group No. 2 the Peerless, Fig. 42, has an angular side but also has a flat top, while the Ford in Fig. 43 has a flat shooting top, and the Murray in Fig. 44 has an even more decided flat, sharp-cornered top. This shape is similar to a number of English cars, viz.: the Rolls-Royce, Lanchester, Edge and Armstrong.

Group No. 3 is a rounding top class and starting with the Marmon, Fig. 45, with not quite a complete radius at the top, and then the Kissell, Fig. 46; Mitchel, Fig. 47; Buick, Fig. 48; Wescott, Fig. 49; Empire, Fig. 50; Haynes, Fig. 51; and Reo, Fig. 52. These all have decidedly rounded tops. The Reo in Fig. 52 has a small, sharp point at the top only and could not be termed a V-front.

Group No. 4 comprises the Hudson, Fig. 53; Mercer, Fig. 54; Chalmers, Fig. 55; Chandler, Fig. 56; Dodge, Fig. 57; Hupmobile, Fig. 58; King, Fig. 59; and the Saxon, Fig. 60. Each one in this group can be easily recognized by their characteristic.

In group No. 5 are the V-fronts. The first one is the Owen Magnetic, Fig. 61; next is the Singer, Fig. 62. These are the only ones with the "V" portion starting at the extreme top. In Fig. 63 the Apperson has a top rounding over to the V; the Moline-Knight, Fig. 64, is similar, so also is the Paige, Fig. 65. The Scripps-Booth, Fig. 66, has a flat portion going to the V. The Maxwell, Fig. 67, is not strictly a V, as the top portion alone is crowned V-like. The Pathfinder, Fig. 68, has a decided V-front.

In the group No. 6 Miscellaneous comes several different characteristic designs. Fig 69 is the Packard; Fig. 70, the Winton; Fig. 7, Olds; Fig. 72, Novara; Fig. 73, White; Fig. 74, the Liberty; Fig. 75, Bour Davis.

Group No. 7 has not many adherents. The Phianna, Fig. 76; the Buss type, Fig. 77; and the Delanuey-Belleville, Fig. 78, are the only exponents in this country.

In the foreign group are shown some radical designs to illustrate some more phases in the trend of radical design. Fig. 79 is the Belgian Metallurgique. Figs. 80, 81, 82, 83 and 84 are various types used on European cars and show a wide range in ideas. No attempt will be made to create a new design, this will be left to the designer to interest himself in, as the collection of shapes in this article will illustrate very aptly what there is before the man who desires something new and original in radiator shapes upon which a new body line can be developed.

Cleaning Grease Off Metals

It seems a simple matter to wipe oil or grease off unpainted or unlacquered metal surfaces, but those who have tried it know it is not; it doesn't come off clean.

Druggists sell an article known commercially as "acid dip," that will take off grease and leave no streaks, stains or smuts. This is especially well worth knowing by those whose duty it is to keep polished metal surfaces clean and bright.

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Fitting Hood and Cowl to Touring Car Body

(See Working Draft on page 31)

With this working draft we illustrate two different practical rules to combine the hood with cowl and body, on which the turn-under lines turn under on base of body, and turn inward on top of body; in fact this inward turn is a continuation of the hood and cowl curve; but as the upper part of body is 4⅝ inches lower than the extreme height of cowl it cuts the turn-in curve at 1¾ inches, shown on A and sectional line 8, half top view. Line B then is the outer top edge of body, and line C is the widest part of body, shown on M, S and K, half front elevation. If the line of the hood at front end has a different shape, lines 1 and 2 are dispensed with and the body maker starts with 3 only, which is the rear end shape of hood, to which the front cowl end is fitted.

On this draft the drop on front edge of cowl is 5⅝ inches from the highest part of cowl, but suppose the hood and cowl to be in a horizontal direction, then all curved lines from 1 to 11 would converge to one single point, a trifle below 6 on center line, half front elevation. But all the rest of the curved lines would be laid out on the same principle. Points A B then would converge to a single point at A, half front elevation.

We give this information in connection with this working draft, because many of the hoods are now made to suit the shape of the body and run in a horizontal direction on top of hood and cowl. The heavy lines on hood, cowl and body represent the outlines of hood, cowl and part of body, including the door joints, the dotted lines represent the working lines, that is the lines used to obtain the points and curves.

The heavy lines on half front elevation and entire front elevation represent the front edge and rear edge of hood, to which the front edge of cowl is fitted. The dotted line 2 between the two heavy lines on front elevation represents vertical line 2 on side elevation, which is needed when the top line on hood and sides of hood are concave. The rest of the curved lines from 4 to 11 on front elevation, in connection with the vertical lines on side elevation, top and bottom views, from 4 to 11, are needed for the various turn-under and turn-in lines on side surfaces, including the shape for top of hood and cowl.

The Rule for Laying Out the Working Lines for Hood, Cowl and Part of Body

Take width from center line to outside of turn-under line and put that width from top line to O T, half front elevation, making a perfect square. From point of upper left corner, draw right angle down to point on right hand corner, half front elevation. Draw the other four angular lines in the same way as shown on half front elevation. Draw full front elevation exactly the same as half front elevation; angular lines, curves and points in exact positions. Make all horizontal lines from 1 to 11, up to center line, half front elevation, starting from each sectional vertical line, crossing U U. Draw horizontal lines from points B, D, F, H, L, N and T, and curved line 1, half front elevation, to front edge of hood, side elevation; also carry points C, E, G and K, on curved line 11, half front elevation, over to C, E, G, K and M, to vertical line 11, side elevation.

Take point on curved line 2 on right angle line, between points G and H, half front elevation, and carry over to point on vertical line 2, between points G H, side elevation.

Take point on curved line 3, on right angle line between points G H, half front elevation, and carry over to vertical line 3, between points G H, side elevation, and make dotted line starting at point H, front edge of hood, to point V on vertical line 3, side elevation. This line is a trifle concave because line U U is concave. If line U U were straight, line H V would be straight also.

Do the same on half top view in connection with half front elevation on the left. Take point on curved line 1 on right angle line, between points G H, and carry over to point H on vertical line 1, which is the front edge of hood. Take point on curved line 2, on right angle line, between points G H, and carry over to point on vertical 2, between points H and V, side elevation. Take point on curved line 3, on right angle line, between points G H, and carry over in a horizontal direction to point on vertical line 3, shown on point V, and make a straight line from points H to G, side elevation. This line is straight because the bottom edge of hood on each side is straight. Take point on curved line 11 on point G, half front elevation, and carry over to point G, 11, side elevation. Lines between points G H, on side elevation, must be regulated to correspond with points G H, on right angle line, half front elevation, as all the points on elevations and half top view must meet at the same point.

For example, we want a point on curved line 7 between points G and H, half front elevation. Carry point on curved line 7, half front elevation, over to point on vertical line W 7, between points V and G, half top view.

Take distance between center line on curved line 7, crossing right angle line, half front elevation, and carry this distance over to point W, on vertical line 7, between points V and G, half top view. Square this point W on vertical line 7, half top view, over to point 7, crossing right angle line, half front elevation. If all four points meet at the same distance from center line and meet also at the same point by squaring over from point to point from side elevation and bottom view to half front elevations, the points are in the correct place and the dotted line is made from point V to G, passing through point W, side elevation. The same is done on half top view from point V to point G, passing through point W. If those four points do not meet, note the difference and adjust them so they do meet. From these two lines, starting from point V, to point G, side elevation and half bottom view, all points are squared over or carried over into the half front elevation as shown on curved lines from points 1 to 11, intersecting with right angle line between points G and H. All points on all other angular lines are taken the same way and the same rule is carried out through the entire operation.

It is very important that all points on right angle line between points G and H are correctly established on the half front elevations, as the curved lines from 1 to 11 must pass through the points on right angle line and are needed also in the application of the other rule, which will be explained later in Fig. 1 and Fig. 2. There are three important distances to be considered in applying this rule. Note center line, half front elevation, from 1 to 11. These distances are squared over from all vertical lines intersecting with points on U U.

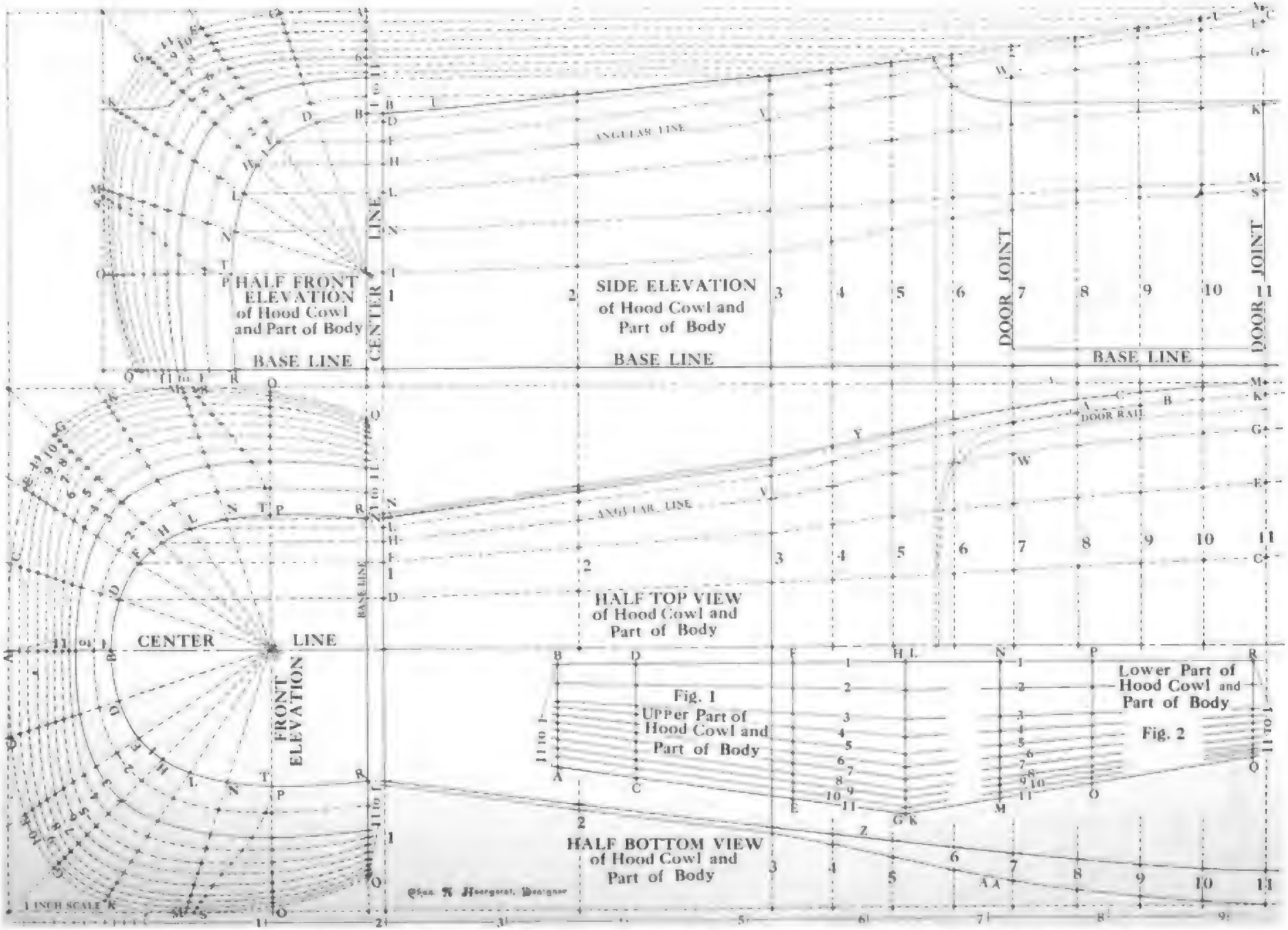
Line Z, half bottom view, is the bottom edge of hood, cowl and part of body. All the points from 1 to 11 passing through line Z, half bottom view, are carried or squared over to base line, half front elevation, from 1 to 11, on R to Q. All the points from 1 to 11 on A A, half bottom view, passing through the points on sectional lines are carried or squared over to half front elevation, creating curved line S T. This line S T is also shown on side elevation and represents the widest part on sectional lines as shown on Y, half top view, and A A, half bottom view. These are the four most important points from which to start the curved lines on half front elevations. From points Q R on base line to points S T, the turn-under pattern can be used by shifting it to the required shape, and the other points on angular lines C D, E F, K L, and M N, are established same as explained on H, V, W and G, side elevation, and by squaring the points over into the half front elevations, producing the curves from point to point.

Explanation of Figures 1 and 2

All the points required to work from are embodied in Fig. 1 and Fig. 2 and it is evident that they are so correct and simple that every body maker can learn the system without any special effort. The upper part is separated from lower part of hood, cowl and part of body.

Start with A B, on center line, half front elevation, take distance from point A to B, and carry it over to A B, Fig. 1. Point A represents the upper point on A and vertical line 11. The points and spaces between A B on center line, half front elevation, are squared over from each intersection from vertical lines 1 to 11 and curved line U U, representing the exact position on each sectional line. All those points are carried over to Fig. 1, from A to B as shown.

All points from Q R on base line represent the spaces from sectional lines 1 to 11, and are squared into the half front elevation from line A A, half bottom view; therefore each



WORKING DRAFT ILLUSTRATING THE FITTING OF HOOD AND COWL TO A TOURING CAR BODY. (See description on page 33.)

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point on each sectional line represents the exact points from Q to R on base line.

Line G H, and K L, Fig. 1 and Fig. 2, represent the right angle line G H and angular line K L, half front elevation. It just happens on this draft that both spaces are alike. If they were not alike there would be another vertical line on Fig. 1 to give the exact space. We have explained above how to obtain the points and spaces on right angle line G H, half front elevation, and these same points and spaces from 1 to 11 are carried to G H, Fig. 1 and Fig. 2.

Take all spaces from Q to R on base line, from 1 to 11, and carry over to Q R, Fig. 2, in the same exact position as on front elevations. Make straight lines, intersecting with each point, from A B, to G H, and Q R 1 to 11. Take distance from points on angular line C D, and carry it over to C D, Fig. 1. To be in the right position it must touch both points on C and D, Fig. 1.

Take space between points E F, half front elevation, and carry it over to Fig. 1 from point E to point F. Angular line K L, half front elevation, is same as right angle line G H. Take space between points M N, half front elevation, and carry it to Fig. 2, from point M to N. Take space between points O P, half front elevation, and carry it over to Fig 2, from point O to P. In these spaces between points, Fig. 1 and Fig. 2, on lines C D, E F, K L, M N, and O P are the same as on half front elevations. The points on right angle line are taken from points H, V, W and G, side elevation. The rest of the points 2, 4, 5, 6, 8, 9, 10 and 11 are squared over from point intersecting with vertical lines and point H, V, W and G. Points A B are taken from center line, and points Q R from base line, half front elevation. Compare some of these spaces on a full size working draft. They are as true as they can be made and will give the hood, cowl and body those beautiful outlines seen only on first-class bodies.

The three systems which we have illustrated, while different in their application, are in some respects the same on each system, as, for instance, the angular lines are needed on each of them, and the result is the same on all three.

Motor Fuels

Abstract of an address delivered before the Franklin Institute, Philadelphia, Pa., December 11, 1919, by E. W. Dean, Petroleum Chemist of the Bureau of Mines.

The use of vehicles propelled by internal combustion engines is rapidly increasing and the production of the raw material (crude petroleum) from which the most important type of motor fuel (gasoline) is obtained, shows signs of reaching a maximum in the near future. Resources of crude petroleum are obviously limited and the Bureau of Mines believes it desirable that conservation and efficiency in the production and utilization of gasoline be promoted.

Before attempting to arouse interest in any movement toward conservation it is desirable to furnish fundamental knowledge concerning the present gasoline situation. A paper has, therefore, been prepared which discusses the production, marketing and use of gasoline, the physical and chemical properties of products now in the market, and present tendencies in the development of gasoline substitutes.

There are in use three general methods for the production of gasoline:

(1) The "straight refinery" process, involving distillation of crude petroleum with subsequent chemical treatment and redistillation of the volatile fractions.

(2) The "casinghead" gasoline process, involving the extraction (by compression or absorption) of liquid constituents from certain types of natural gas.

(3) The cracking process, involving the decomposition of heavy petroleum distillates under heat and pressure with the formation of gasoline.

The three types of gasoline differ somewhat in physical or chemical properties, but are all entirely satisfactory as motor fuel if properly produced.

The production of gasoline has increased from approximately thirteen million barrels for the year 1909 to over eighty-five million barrels for the year 1918, a gain of about 560 per cent. The production of crude oil in the United States has during the same period increased only about 95 per cent., while the number of cars and trucks in service has increased about 1700 per cent. This means that although the petroleum refiner has increased his efficiency more than has the producer, he has not kept pace with the manufacturer of automotive vehicles. The possibility of a motor fuel shortage in the reasonably near future, unless other sources of supply are developed, is indicated by these figures.

Certain seasonal variations in the production, consumption and storage of gasoline may be noted. Production decreases slightly in the winter months and is at a maximum in the summer. Consumption varies considerably with seasonal conditions and is less than production in the winter months and more than consumption in the summer. Stocks of gasoline vary in the same proportion, but in the reverse direction from consumption.

Marketing practice for gasoline is complicated and does not follow general rules very closely. Variations in the price of gasoline are controlled by costs of transportation and demands of consumers as regards quality to a certain extent, but there are hosts of variations.

The most important property of gasoline is its volatility or distillation range. This property is subject to a certain general variation in different parts of the country. The Pacific Coast States receive the most volatile type, the Rocky Mountain States the least volatile. The Atlantic Coast States seem to require and receive gasoline somewhat less volatile than that marketed on the west coast. The volatility of gasoline marketed in the mid-continent States is intermediate between that of the Atlantic Coast and Rocky Mountain States.

Surveys of the grades of gasoline marketed throughout the country were made by the Bureau of Mines in the spring of 1917 and the spring of 1919. It was found that during the two-year period between these surveys a certain degree of change occurred in the general quality of gasoline. The percentages of low boiling fractions remained practically the same, but the end points or upper boiling limits were higher in 1919 than in 1917, the difference being between 25 and 30°F. It is believed, however, that improvements in the design of engines have fully made up for this difference and that users of motor vehicles are having no more fuel trouble than they had two years ago.

Tests for the presence or absence of acid in gasoline are believed to be of practical value and are usually included in specifications. Tests for the percentage of olefin or unsaturated constituents are of scientific interest but are not believed necessary in specifications. The widely-used gravity test has been shown to lack practical value in indicating the grade and quality of gasoline.

It is believed that oil shale may develop as a resource for motor fuel as petroleum reserves are depleted. Alcohol is also a potential motor fuel of the future and is already being marketed for this purpose in the form of a blend with coal tar and petroleum distillates. Coal tar distillates are at present the most important type of gasoline substitute and are to be obtained in markets adjacent to by-product coking plants. They are undoubtedly satisfactory products if properly utilized, but the maximum resources of such fuels are not sufficient to permit them to take rank as more than a slight factor in the problem of gasoline conservation.

Aircraft Co. Makes Auto Body Parts

The Aircraft Engineering Corporation, 535 East Seventy-ninth Street, New York, has secured the services of John H. Gatoff, as their general superintendent of plant A. This concern spent a half million dollars on equipment while in the manufacture of airplanes. They have decided to devote part of their shop to the automobile trade. The nickel-plating plant, which is one of the largest and best-equipped in New York, will cater solely to the automobile body builders.

Mr. Gatoff, who is a body builder and draftsman and is thoroughly familiar with the New York trade and its requirements, has decided to give this part of the plant his immediate attention, and then devote his time to the machine shop. It will be a great convenience to the body trade, as New York body builders have been having considerable trouble with this part of their work.



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Painting and Finishing

Surfacing Putty Glaze

For the car surface having plenty of checks which do not run right through to the metal or wood, the putty glaze method, as a means of avoiding the burning torch or the varnish remover, offers something of value.

Putty glaze, or facing up with putty, as the method is variously called, is a quick and simple means, and an inexpensive means, too, of getting a surface over a condition which, without this method, would call for roughstuff and many expensive processes to make good.

The putty glaze man should have for a foundation some close-laying, adhesive pigment calculated to stick closer than a brother and to penetrate the checks and fissures and to an extent fill them and seal them up.

There are two distinct forms of applying the putty glaze. One consists of using a brush in the pigment mixed to a rather stiff brushing consistency. Lay on plenty of the mixture and then with a broad-bladed knife held at an angle of forty-five degrees and pushed firmly upward shave off all surplus pigment. As the knife is forced upward it will naturally under the pressure imposed press a good measure of the material into the checks.

The other method of putting on the glaze consists of using the pigment a little heavier in body than in the first method and taking some of the material on the blade of a broad scraping knife, half-elastic, draw it from the top of the panel downward at the same time using enough pressure to force the pigment into the cracks and fissures. This plan will require an exceptionally good knife hand; one experienced in doing this class of work, and who is painstaking and thorough. Such a one will bring out the surface in a fine, velvety effect, giving it body, smoothness, loveliness and a good condition to surface upon.

Now as to the plan of surfacing. If the pigment has been distributed in a proper shape and the smoothness spoken of has been produced, and the correct level condition developed, the sandpapering work will have been reduced to a small item, comparatively speaking.

On the other hand, if this work has not been performed with precision and without knife marks and fine welts, the sandpapering will develop into a big and sweaty job sufficient to tax the patience of the most industrious.

Sometimes it is the best practice to lay on a coat or two of roughstuff over the glaze as a means of correcting certain surface inequalities, or of getting body enough to back up and hold out the finish. Then when this is rubbed down one may be sure of having a substantial and well-worked-out surface pattern upon which to construct the finish.

Proper Preparation of Paint

Many very excellent paints are rendered negative through inadequate preparation for application. They are thrown into the container carelessly and then failure to beat them up and smooth them out under the mixing ladle produces an inferior article.

The good color or paint merits—in fact must have—a fine, correct treatment as a means of balancing the material up to its natural qualifications. The paint as it goes into the container needs a gradual breaking up through the addition of the right sort of reducing medium.

It never is a good practice to splash over the contents of the container a great volume of thinner at one time, and then with the ladle attempt to get a smooth and perfectly balanced pigment, because this is not the natural way for a paint or color to break down and liquefy.

When this kind of mixing is resorted to one will always find in the bottom of the container a sediment or a coarse condition of pigment which is certain to prove troublesome as the material is worked out under the brush. As the paint goes lower in the container the brush is constantly dipping into this coarse, partly broken-up, pigment and distributing it over the surface. These fine, granulated particles shape up on the surface and give it a dirty, gritty appearance and feel that is most unmistakable and likewise inexcusable.

The painter has it well within his power to practically ruin the best paint through a wrong method of preparation.

This practice of fitting the paint for the surface should be studied with greater detail, for upon it hangs all the law and the teaching of the painting craft for two hundred years.

The work should be gone about systematically and with a due regard for all the nice and intricate matters which make up the paint mixing problem. A portion of paint to meet the requirements of the occasion should be taken over into the container, and to this should be gradually added the thinning medium, the mixing ladle meanwhile doing duty and gradually fetching the pigment to a soft, even state from which it finally comes forth a smooth, plastic, clean-flowing material, which under the brush flats out and comes down to a velvet finish pleasing to see.

This condition cannot be had except the paint is broken up and made ready for application as here described; and the advice applies to all pigments used in vehicle painting, from the commoner forms of paint to the finest colors marketed. Haste makes waste in this matter of preparing paints and colors. More careful methods at a slower pace furnishes the real economy.

Varnishing Running Parts or Chassis

To produce upon the running parts or chassis a satisfying finish one must begin at the beginning. Each coat from first to last must in some particulars be a law unto itself; also, it must have a direct and indispensable relationship to all the other coats, so that at the end of the process an indivisible whole will be the result. This is good logic and good painting. You cannot ignore the rule and get what the public demands in the way of a fine finish for the running parts of the car.

After the primary foundation has been established on these parts of the car, with all fullness and body and perfection of surfacing detail given due heed, we are ready for the color-varnish.

For the running parts nothing contributes more in the way of quality and "toning up" treatment than color-varnish. Use the color, so far as all ordinary pigments are concerned, in the proportion of one-quarter pound of color to one pound of varnish, this being the equivalent to a pint. Reduce the color to a fairly cream-like consistency with turpentine, after which add the varnish gradually, meanwhile stirring vigorously, until the mass comes down to a fine, smooth, free-flowing pigment. Dust off the parts very thoroughly, paying particular attention to the crevices and crannies which catch and hold the foreign substances.

With a badger hair brush flow on a full, ample coat of the material—all the surface can take care of without forming runs and curtains.

When this coat has dried perfectly rub it lightly with pumice stone flour and water, using a soft piece of felt to get the erosive effect. Then wash clean and dust off carefully, after which flow on another coat of the color-varnish, this second coat, however, to be made more of a varnish coat than the first one. That is, add one ounce of color to a full pint of the varnish. This will serve to retain the original purity of the color and

at the same time round out the surface with a fullness which only the varnish can give.

After rubbing this coat down firmly and to a soundly dull effect, proceed to stripe the surface. After the lining work has dried fully, wash clean and dust off and flow on a coat of clear rubbing varnish.

Make the surface carry all the varnish it is capable of. This is the coat that should really be equivalent to the finishing coat and it should be quite as clean and upstanding as the finish. Lightly rub this coat in due season, wash and clean perfectly and finish by flowing the surface richly.

Mixing and Matching Paints

This is a fascinating branch of the trade; practically every employe of the paint shop likes to dabble in paint and linger at the mixing bench where the various "batches" are made up.

For the greater part, paints and colors come mixed ready to use, except for the thinning with turpentine. Nevertheless, there are many pigments which must be shop mixed, and still many others which must be matched to meet certain requirements. All this work has to be performed at the mixing bench. Hence, this part of the shop is one of the most interesting.

The average mechanic is a failure as a paint and color mixer; he lacks color sense, for one thing; for another, he is lacking in the faculty of proportions. Again, he is deficient in patience without which even the natural born paint mixer and matcher must prove a failure.

The faculty of proportion—of judging somewhat as to the strength of a pigment—is at least one of the things which the paint mixer simply must have, if he would succeed.

As an illustration, we are told that to mix a French red, Indian red and vermilion are to be glazed with carmine. Now the question intrudes as to how much of the Indian red and the vermilion—that is, what amount of each—is to be used in making the groundwork? Here the faculty of reaching the correct proportions must come into play. Now as a rule the expert mixer will tell you that the Indian red should be added to the vermilion only to the extent of saddening down the vividness of the latter pigment. With the carmine glazed over this we at once have what is commonly understood as French red.

Even though one were told the exact proportion of the vermilion and the Indian red necessary to use to effect the right combination, there would still be an element of uncertainty enveloping the process, simply by virtue of the fact that the strength of the pigments varies considerably with different grinders and manufacturers. The Indian red sent out by one firm might have a third more color power than one sent out by some other firm.

As a matter of fact this thread of uncertainty runs through all the activities of the paint mixer. Almost intuitively the skillful and trained paint mixer and matcher is able to judge with surprising accuracy as to the coloring power of any given pigment, and this rather uncanny judgment runs the entire length of the list of pigments. It enables the possessor to get the correct balance without loss of time or of material. The young man who desires to become an expert paint and color mixer and matcher should first inform himself concerning these fundamental characteristics, for they are at the heart of the process.

The Sword and Dagger Pencil

Down in a busy shop on Delancy Street, New York, during the year 1863, Sam Sniffen, a very expert striper and ornamental painter, invented the sword pencil which, with perhaps some improvements, was destined to fairly revolutionize the art of vehicle ornamentation. From the sword pencil came the dagger pencil, which in later years proved a sturdy rival.

These pencils were for years made and sold by brush manufacturers, but somehow the men in the shops who used pencils for what they were worth, never to any great number, became satisfied to employ these factory-made pencils. They insisted upon having the shop-made ones.

Later, many expert stripers set about to make these pencils for the trade, and not a few of them succeeded in building up a considerable sale in this line. Even to this day many of our good liners prefer to either make their pencils, or to have some practical workman skilled in the use of the sword or dagger pencil, to make them.

To make the sword pencil, use the hair from a swan quill pencil, choosing the best quality of hair. Take the hair from the quill pencil and draw to the correct bevel, or the bevel that suits you individually. Draw the hair from one side of the flat portion of the hair. Then, taking the hair carefully in the left hand, with the thumb and forefinger of the right hand work a bit of trimmers' paste into the end that is inserted into the handle.

Narrow strips of paper, say three-quarters of an inch in width, and of the full length of the hair, are cut and spread with a thin glaze of the paste, and on these prepared strips, about the center of them, lay the hair, keeping it perfectly straight. Next fold the uncovered portion of the paper over the hair. The day following, or any time in the future, the superfluous hair and paper may be trimmed off and a handle attached. A straight-grained piece of pine yields a good handle. Split in center of handle, and into this fracture insert the hair. Then wind carefully and firmly with stout linen thread, and the pencil is ready for use.

In the making of these pencils there is often a superfluity of short hairs which it is necessary to make way with. To remove them, take the hair before it is greased, and with the end that is to be bound with the thread held between the thumb and forefinger of the left hand, pull the long hairs over to the right, thus exposing the short and useless hairs and affording an easy removal of them.

This treatment develops the pencil of one length of stock, and brings to it a finer balance and greater suppleness and an easier control, all of which are important merits of a sword or dagger pencil.

Sandpapering

Such a simple operation, you say. Nevertheless these simple processes are after all the most difficult to do well. Varnishing is an illustration of this statement. It is at once the most simple in its apparent conditions and yet in the application of the principle it represents perhaps the most difficult of any of the processes connected with vehicle painting and finishing, apart from the ornamental features.

So few, comparatively, are ever taught thoroughly to use sandpaper as it should be used that we find in a long list of shops a vast amount of neglect of the fundamental requirements governing the work.

There is a great deal of waste, for one thing, connected with the use of sandpaper. Then there is more waste as a result of not using it correctly. The employe who handles the sandpaper carelessly when working upon the surface is more than likely to cut the pigment to an excess; or he may bare the edge of the surface, or he may even work in so many different directions that his work becomes an actual detriment.

The average man fails to hold the sandpaper correctly, and as a result the waste already referred to ensues. The paper should be used in a single sheet form, and not folded, except to meet a condition quite unusual. Then it should be taken in hand in a way to give all the fingers of the right hand something to do in the task of holding it firmly and make it lay close to all the various conformations of the surface.

In particularly fine work it will be an advantage to strip the back, or thin covering of the paper—to split it, as we say in the shop—so that it can be held closer to the surface and yield an increased pliability in the handling, and work down smoother than could be the case without so treating it.

It is always the part of wisdom to study the real needs of the surface with respect to the choice of the paper. Do not select a paper too coarse for the character of the surface, nor too fine. Make it a rule to suit the paper to the surface precisely. Also give due heed to the number which describes the paper as fine, or coarse, or medium, etc.

Different makes vary greatly in this respect. A No. 1 paper in some makes runs as coarse as No. 1½ in other makes. Caution in this matter will save much expense in the end.

It is a good rule to observe in sandpapering to keep off the surface edges; to work in one direction as to strokes of the paper; to catch the outer rim of the surface first, and to avoid cutting through to the undercoat, thus weakening the foundation.

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The next time this tag is affixed to an automobile to be refinished use

Murphy Overnight Finishing Varnish

THE cry is for speed in the vehicle paint shop as well as everywhere else. Nearly fifty years ago the Murphy Varnish Company showed the vehicle painters of the country how they could cut down the time of painting their vehicles from three months to six weeks by the use of a quick system of undercoats, the A. B. C. System.

Every decade since that time has seen an endeavor on the part of the paint shops to cut down the time required to do a good job of vehicle painting.

Here, gentlemen, is the Overnight System of vehicle varnishes:

Overnight Finishings	$6.00
Overnight Gear	$5.00
Overnight Rubbing	$5.00

Of course, it is not intended to do the finest grade of work with this system. Overnight Finishing Varnish is not the equivalent of our highest grade finishing varnish. It is a fine finishing varnish that will dry over night.

Our claim is that these varnishes are the quickest *good* varnishes made and the best *quick* finish varnishes made.

There is an immense amount of work that must be done quickly—where speed is more important than the finest work. These varnishes are intended to meet this situation.

Use the Overnight Varnishes to meet the unusual demand: "Must be done for Saturday, Bill."

Use them to save time in your shop—to enable you to get out more work, use them for all "RUSH" work.

Write for the Overnight leaflet. Better still, order by mail, telephone or wire, a trial lot of these varnishes, *on approval*, returnable if unsatisfactory.

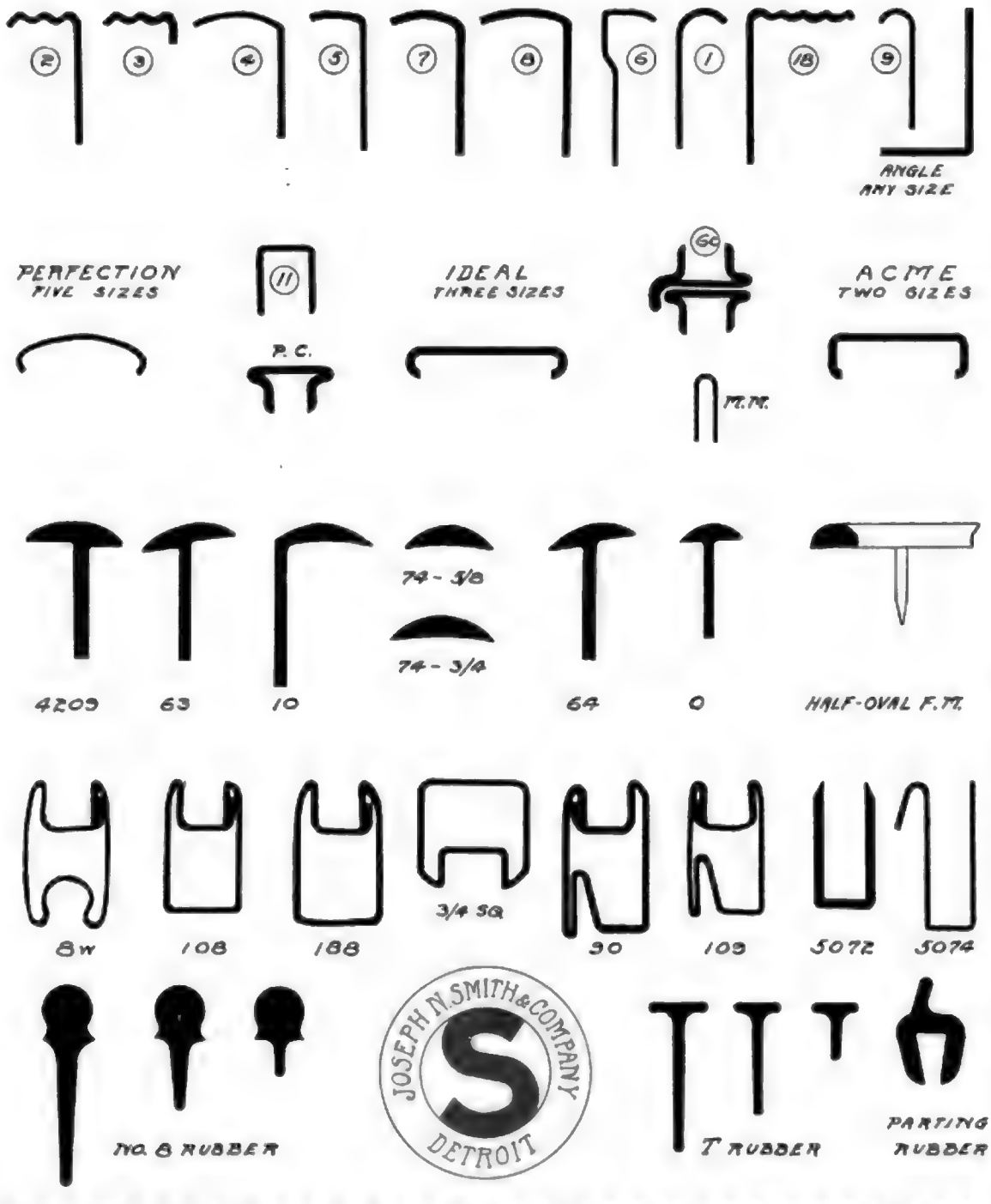
Murphy Varnish Company

Franklin Murphy, jr., President

NEWARK CHICAGO

The Dougall Varnish Company, Limited, Montreal, *Canadian Associate*

MOTOR CAR MOULDINGS



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Upholstery, Toppings, Mountings

Robes, Upholstery and Top Materials

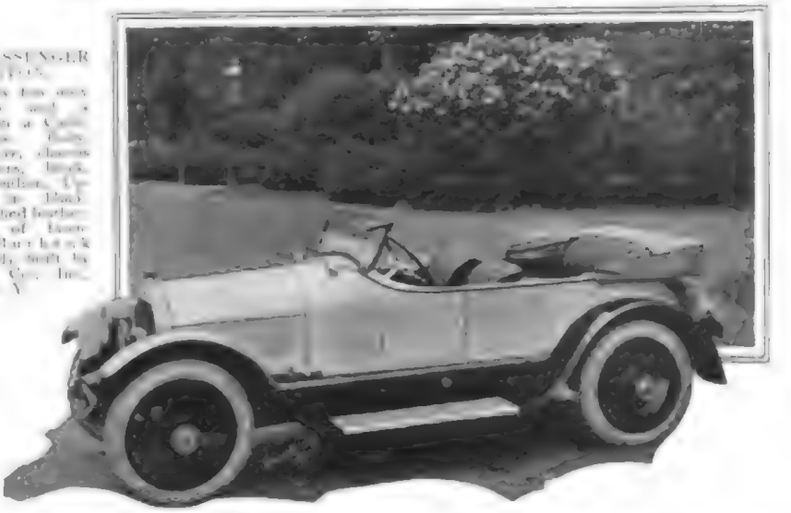
Beautiful plush motor car robes, in a wide range of patterns, sizes, weights and prices, were exhibited at the New York automobile show by L. C. Chase & Co., Boston, Mass.

Chase mohair velvet upholstery materials were also exhibited in their splendid variety. Of this material the manufacturers say: "Upholstery for motor cars must be durable as well as beautiful, and it must be a material which is easily kept fresh and clean." Chase mohair velvet meets all these requirements so perfectly that it was natural for automobile body builders to select it as the most satisfactory material for their finer cars, particularly for closed cars and all-year models. The unequalled variety of patterns, designs and colors, permits a selection which best harmonizes with the color scheme of the car. Experience shows that this beautiful upholstery adds materially to the value, distinction and individuality of the car. Its vogue as *the* upholstery for quality cars is very marked.

Chase "Drednaut" motor topping was of course in evidence at the company's space, and was also to be seen as applied to actual use on many of the better grade cars displayed at the show.

Big Showing of Body Mountings

The exhibit of C. Cowles & Co., New Haven, Conn., at the New York Palace show was a comprehensive showing of their many lines of lamps and mountings. Among the numerous articles shown were lamps, toilet cases, cigar lighters, handles, curtain fixtures, window fasteners and anti-rattlers, moldings and ends, umbrella holders, coat hooks, landau top fasteners, ventilators, arm holder swings, ventilating knobs, front window fixtures with rain vision attachment, broad lace holders, curtain fasteners, mechanical window lifts, window channels, etc. Mr. Bottume, of the home office, was in charge. The company also made a similar exhibit at the Chicago show in the Coliseum.



FOUR-PASSENGER PHAETON.

This body has two doors and is mounted on a Cadillac chassis. Finished in French gray, chassis and fenders, black; wheels, vermilion; upholstered in [illegible] bright finished leather with top of [illegible] colored Burlenback cloth. Body built by Brunn & Co., Inc., Buffalo, N. Y.

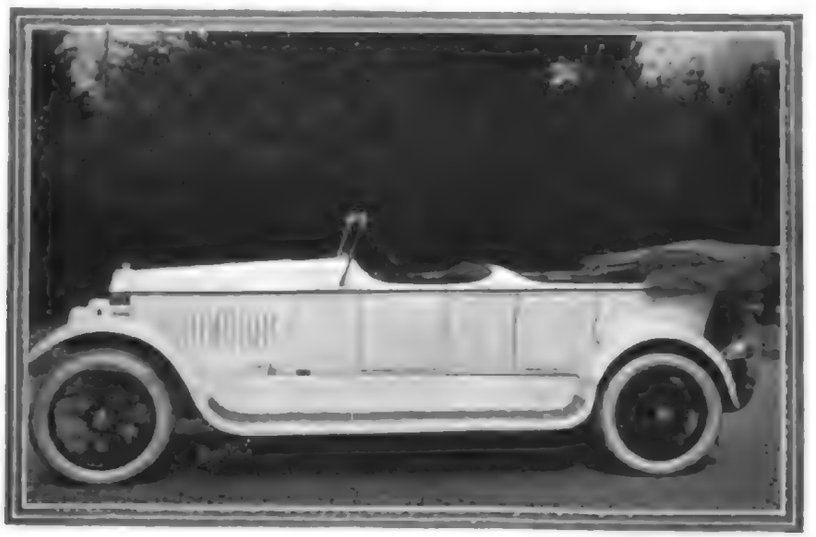
Greater Door Lock Efficiency

In keeping with the many improvements brought about in motor car construction, motor car manufacturers and body builders have long felt the need of greater efficiency in door locks. The "Sears-Cross" lock, with the expanding latch feature, embodies in its construction and performance points which are lacking in other door locks. They prevent rattling of doors, insure protection against doors opening accidentally; overcome present difficulties in opening and closing doors, and automatically take up wear. Visitors at the New York automobile show were greatly interested in studying the unique features of the Sears-Cross locks, which are already favorably known and used by so many builders of better grade bodies.

Pantasote at the New York Show

The Pantasote Company, New York, had an impressive exhibit of top coverings and upholstery materials at their space in the Grand Central Palace Show, New York. Among the literature distributed at the show none was more interesting and instructive than the booklet "What's What in Top Materials," which was handed out at the Pantasote booth. A copy of this booklet may be had by addressing The Pantasote Company, 11 Broadway, New York. Many of the best cars at the show used Pantasote as a standard top material.

The English & Mersick Co., New Haven, Conn., had a comprehensive exhibit at the New York automobile show, comprising many styles of hinges, handles and locks, as well as steel radiator shells. Besides the goods named this company manufactures an extensive line of carriage and automobile goods in metal, including all mountings, fasteners, channels, moldings, rails, etc. Practically every metal part or mounting needed by the body builder and upholsterer can be supplied by this old-established house.



FOUR PASSENGER PHAETON.

Has Rolls-Royce radiator and headlights and is mounted on a Marmon chassis. Painted cream color, with maroon molding and stripes, and is upholstered in maroon leather. Body built by Brunn & Co., Inc., Buffalo, N. Y.

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Brewer-Titchener Expansion

At the last director's meeting of the Brewer-Titchener Corporation, Cortland, N. Y., the sum of one-half million dollars was voted for expanding our manufacturing facilities. The plans include an addition to the forging shop, accommodating about twenty-five 3000-pound drop hammers and other equipment, additions which will increase the output of the bow socket plant to 4500 sets per day, and the building of an up-to-date stamping plant at the Crandal-Stone division, Binghampton, N. Y.

Ternstedt Hardware at the Shows

The Ternstedt Manufacturing Co., Artillery and Muster Avenues, Detroit, exhibited their complete line of closed body hardware at the Hotel Commodore, New York, during the week of the shows, and also at the Congress Hotel, Chicago, during the exhibitions in that city. The Ternstedt company have recently enlarged the office space at their Detroit plant, and now have a suite of nine or ten rooms, nicely partitioned, with plenty of light. A further enlargement of office facilities is contemplated.

Substitutes Keep Down Living Costs

Leather substitutes as upholstery on high-priced automobiles, fine furniture, in trunks, bags and luggage goods generally used to be sneered at; particularly purchasers would not accept them. But not now. Patriotism is in the ascendency. Rather is the man likely to be criticized who refuses to help keep down living costs by demanding hide leather—shoe leather, if you please—on articles in connection with which a good grade of leather substitute could just as well be used. He is

(Continued on page 56)



Choice of two fabrics is offered for the upholstery of the new National Sextet Coupé, the richer of these being a velvety Mogul gray velour. Nearly all interior fittings of the car are nickeled, exhaust heater, an octagonal dome light, and a lid-fitted compartment at back of the driver's seat that is ample large for carrying a physician's bag or lawyer's portfolio.



Left. Shows rubber-gauzed velvet pockets in the doors, concealed under the flaps. All Stephens Salient Six Enclosed Cars have these pockets.

Right. French plaited upholstery, silk roller curtains that are automatic. The color scheme is French gray, carried out with a tasteful use of walnut. Fittings and mounting of French gray metal.



TWO VIEWS GIVING UPHOLSTERY DETAILS OF THE STEPHENS SALIENT SIX ENCLOSED CARS.

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O'BANNON COATED FABRICS

Moleskin Quality

for upholstering is very effective and enduring



Can be washed with soap and water without injury. Oil and grease have no deleterious effect upon it.

Furnished in genuine leather grains and in a variety of colors.

Write for Samples

O'BANNON CORPORATION

Manufacturers of Leather Substitutes, Rubberized Top Fabrics, Enameled Muslins, Ducks and Drills

200 FIFTH AVE. :: NEW YORK

O'BANNON COATED FABRICS

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O'BANNON COATED FABRICS

DUXRANE

REG. U.S. PAT. OFF.

SINGLE-TEXTURE TOP-FABRIC

GIVE it the *Scrub Test.*

Take a piece of Duxrane in your hand and treat it rough. Scrub it together unmercifully, precisely as a washwoman scrubs clothes. Don't be afraid of injuring the surface, because you can't. Rub it hard, so hard that the surface will become hot, then try to peel off the coating. You will find that it adheres so tenaciously to the fabric that it cannot be peeled. This is the test devised by experts who buy rubberized top fabrics. It is far more severe than any test to which the material could possibly be subjected to in actual use or service. Isn't there a sense of satisfaction to you as a Trimmer to know that the tops you put out will stand up under the most severe use and service and retain a new, snappy appearance? Let us send you a sample of Duxrane to test as we have suggested. Seeing is believing and a test is the final proof of superiority.



O'BANNON CORPORATION

Manufacturers of Leather Substitutes, Rubberized Top Fabrics, Enameled Muslins, Ducks and Drills

200 FIFTH AVE. :: NEW YORK

O'BANNON FABRICS

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THE HOUSE *of* HIRST-ROGER CO.

Manufacturers of



CARPETS





Non-shrinkable, Durable Carpets Made Especially for Automobiles, of Wools, Worsteds, Jutes and Horse Hairs

Reproductions of several popular colors on next two pages

ESTABLISHED 1884

Kensington and Allegheny Aves., Philadelphia, Pa.

Western Representative

JOS. H. AUSTIN COMPANY, 21 E. WOODBRIDGE STREET, DETROIT, MICH.

THE HOUSE of H

MANUFACT

CARPETS

Distinctive
Dependable
Motor Car
Floor
Coverings



All
Colors
Are
Fast and
Enduring





ESTABLISHED 1884

ALLEGHENY AND KENSINGTON

Western Representative: JOS. H. AUSTIN COMPANY

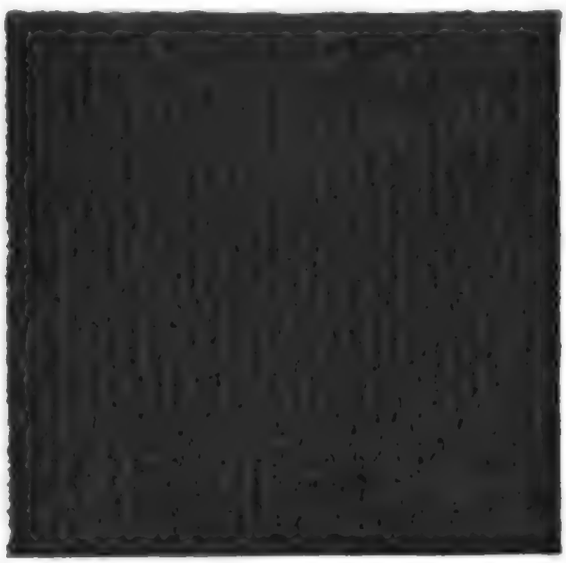
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IRST-ROGER CO.

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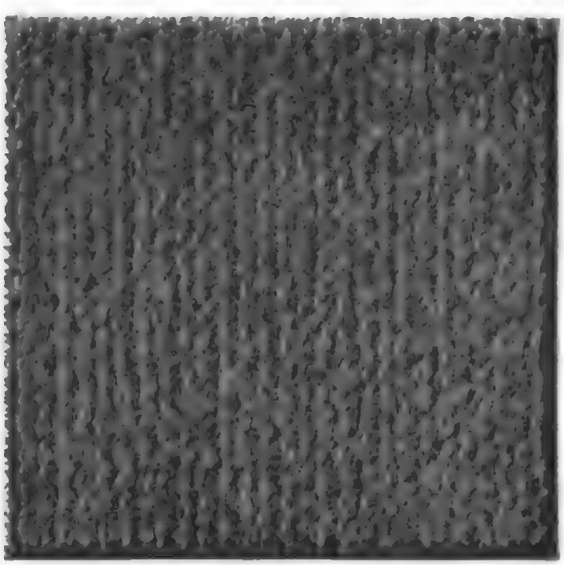
CARPETS

We
Make Carpet
to Match
Any Color
Trimming



You Get
What You
Pay for—
Quality and
Measure





ESTABLISHED 1884

AVENUES, PHILADELPHIA, PA.

21 EAST WOODBRIDGE STREET, DETROIT, MICH.

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THE HOUSE *of* HIRST-ROGER CO.

Manufacturers of

CARPETS

THE GOODS THAT MAKE GOOD

THE GOODS THAT MAKE GOOD

THIS BOOK TO TRIMMERS AT COST

Experts and apprentices will find it a valuable work. It is right down to date in every phase of motor car upholstering. Contains 175 pages and is profusely illustrated. Has a rich blue cover stamped in gold; measures 6x9 inches.

$2.50

Remitted by registered letter, postal or express money order, will bring you this handsome volume, the study of which makes every trimming problem easy to solve.



REMEMBER please that we are not publishing this work for a profit—the price just covers compiling, printing packing and shipping.

Kensington and Allegheny Aves., Philadelphia, Pa.

Western Representative

JOS. H. AUSTIN COMPANY, 21 E. WOODBRIDGE STREET, DETROIT, MICH.

Trading in the Old Car

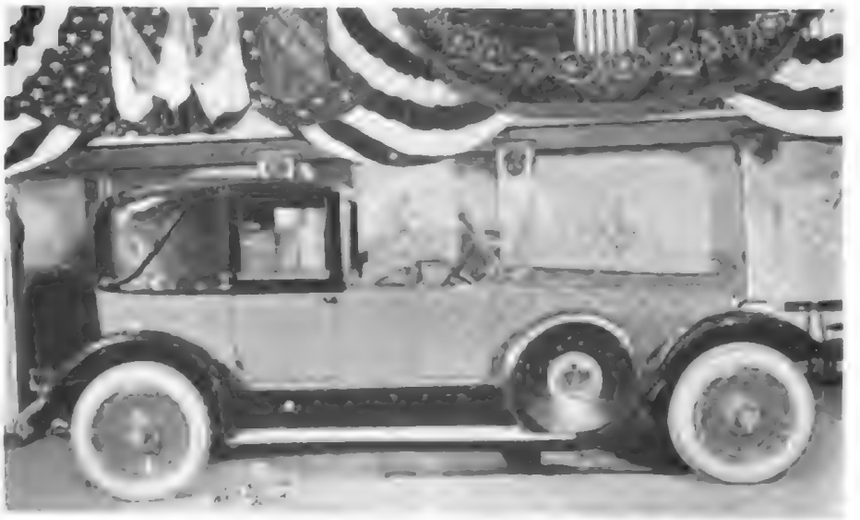
The power plant of a good car will continue to function well years after the top and the finish on the body have become very shabby. In fact, many cars are "traded in" just when the power plant is at its best. All mechanics know a new piece of machinery doesn't operate smoothly and at full efficiency until it has been run some time. Meanwhile, the paint, varnish, lacquers, etc., put on to make it look attractive in the show room have lost their pristine newness.

It's all very well to get a new car every year if one can afford it, but many do it who cannot afford it, and it really isn't necessary in most cases. An examination will generally show that the power plant is in good shape, and the surface shabbiness will readily yield to the skilled ministrations of an auto painter and top maker.

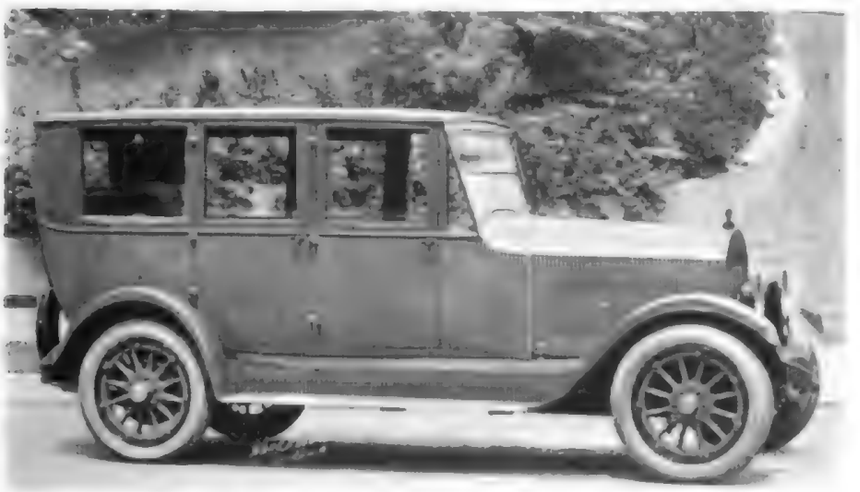
This is not an argument in favor of keeping a car in service for several years. After the power plant begins to deteriorate repair bills mount up; annoying breakdowns on the road become too frequent and it then becomes economical to replace the old car with a new one, but such replacement is by no means necessary as often as many car owners seem to believe. The painter and trimmer can work wonders with a car showing signs only of surface wear. It is needless to say that the trimmer and painter should possess enough business sense to make this fact known to every car owner in his territory.

It's very true in the auto industry that "willful waste causes woeful want" and it is waste to discard a perfectly good auto power plant just because the outer shell doesn't look as spick and span as it might.

William Bryan and W. A. Evans, of the selling force of The English and Mersick Co., New Haven, Conn., have resigned and will start business, together with Max Voigt, who was also connected with the above-named company. The new concern will go into the manufacture of locks, hinges and other specialties at New Haven, under the name of The E. V. B. Manufacturing Co.



Fleetwood Cabriolet Body exhibited at the New York Salon Show. (See also cut at bottom of page.)



Cole Aero Eight "Toursedan" (Seven Passenger).

Leather and Leather Substitutes

Hide leather has been very successfully imitated in so far as appearance goes. The substitutes are available in all the standard leather grains and colors. For furniture and automobile upholstery, shoe trimmings, bookbinding, hat sweats, traveling goods, etc., they have proven economical and practical conservators of genuine leather, but for such uses as shoe vamps and harness, a material is required that will stand continuous flexing and bending.

Recently there has been a tendency to turn from land animals to denizens of the briny deep in the search of leather; fifteen-dollar shoes is the main reason. The hides of whales, sharks and dog fish are being experimented with. Soon we may expect to hear ladies in the shoe shops demanding footwear made of shark uppers and whaleskin soles.



Touring Body shown at the New York Salon Show in November. Built by the Fleetwood Metal Body Co., Fleetwood, Pa., and exhibited in charge of their New York sales department, The Fleetwood Co., Fifty-ninth Street and Broadway. Motor chassis.

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Substitutes Keep Down Living Costs

(Continued from page 42)

regarded as out of sympathy with the poor.

It is because of this new spirit that many of the country's most prominent trunk and bag manufacturers, automobile and furniture manufacturers are now using leather substitutes, and some of them bragging of it in their advertising, whereas, a few years ago—yes, in some cases a few months ago—they were refusing to use them altogether, or apologizing for the goods if scarcity or high price of hide leather compelled them to substitute.

Patriotism; that's the answer. It is now recognized to be the right thing to do anything practicable to reduce the cost of living. And then, too, the more prevalent use of leather substitutes has shown that they have real merit; that they are nothing to be ashamed of; that in their recognized sphere, they are thoroughly satisfactory, leaving aside the question of whether they are or are not a substitute for something else that formerly was largely used for certain purposes.

And there are many articles of commerce besides leather, too, for which thoroughly satisfactory, albeit cheaper, substitutes are available or can be found. See how oil is replacing coal for power generation. It's cheaper now. Secretary Lane advocates making greater use of natural water power to substitute for both coal and oil. It's cheaper; much cheaper. Its utilization will greatly help to lower the cost of living. It is patriotism of the higher grade that actuates the consideration of these things.

The site of the executive offices of the Dort Motor Car Company in Flint, Mich., was the original site upon which Angus Smith, the founder of the city, erected the first trading post in that part of the country. Years later J. Dallas Dort, now president of the Dort Motor Car Company, and William C. Durant, now president of General Motors, formed a carriage company, from which the big enterprise of Flint has developed.

The Art of Motor Car Upholstering

A new book just issued by The Hirst-Roger Company, Allegheny and Kensington Avenues, Philadelphia, with the title "The Art of Motor Car Upholstering," gives instructions to the apprentice, and the more advanced workmen as well, on the fundamentals of the art of trimming automobiles. Most of the book is devoted to passenger cars, but there is a commercial car section which gives valuable pointers on this work.

The book is one for which there has been a demand, and so far as we know is the only one of its kind published. It will no doubt receive an extensive circulation among trimmers who desire to improve their skill in the exercise of their trade. The book is bound in cloth and sells for $2.50.



FOUR DOOR BERLINE LIMOUSINE.

This body is mounted on a Cadillac chassis, and has Rolls Royce radiator and headlights. This body is upholstered in dark green cloth, and painted in two shades of olive green. Body built by Brunn & Co., Inc., Buffalo, N. Y.

Vulcan Sales Convention

Representative members of the sales organization of the Jenkins Vulcan Spring Company convened at the factory, Richmond, Indiana, from December 27th to December 30th for the discussion of 1920 plans.

"The convention was a tremendous success from every possible standpoint," said T. B. Jenkins, president. "Advertising came in for protracted discussion, and all of us were tremendously in favor of continuing our established policy of liberal advertising both in the trade papers and in general periodicals of national circulation. Our plans have been laid for doubling our sales for 1920 over 1919, and it was the unanimous opinion of all salesmen and branch managers present that we would put this campaign over with a wallop."

Lancaster Body Company

The Lancaster Body Co., Lancaster, Pa., successors to the Mack Body Co., have taken possession of the large new building adjoining the factory of the Rowe Motor Mfg. Co., Fountain and New Holland Avenues, and are well equipped for the manufacture of passenger car and commercial truck bodies of every description.

A large addition is being made to the present building and new and up-to-date machinery is being added. The addition measures 120 by 100 feet and is the same size as the original building.

When the additions have been completed and the new equipment installed it will be one of the most modern and well-equipped body factories in this country, which will be welcome news to a great many automobile and motor truck factories who are looking for a new source of supply.



INTERIOR OF AN OMNIBUS BODY IN LEATHER SUBSTITUTE

This body was built with upholstery and painting complete by J. A. McLaughlin & Bro., Circleville, Ohio. It is used to carry children to and from school.

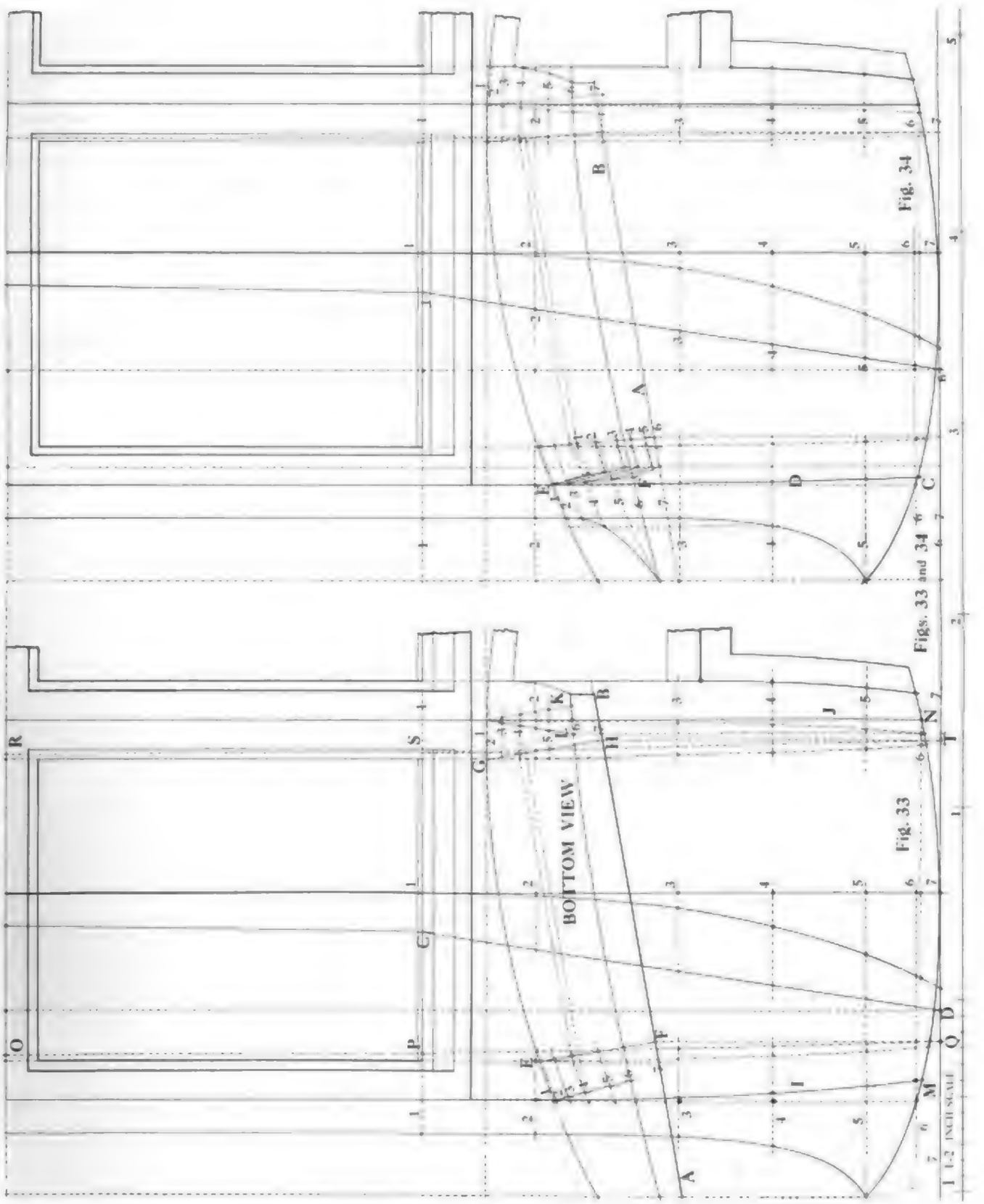
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The Vehicle Monthly Course in Drafting and Construction

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Part E—Lessons 33 and 34. The Contracted Brougham and Limousine Doors

(Continued from pages 30 and 31, January, 1920, of "The Vehicle Monthly.") (For description see page 52)



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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Hoergeist, Technical Editor and Draftsman of "The Vehicle Monthly."

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Subjects Treated in Previous Numbers

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" — " 2—Framing a Four-Cornered Seat		" — " 19—Obtaining Lengths, Heights and Curves by Triangulation	
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BACK NUMBERS CAN BE HAD FROM THE PUBLISHERS

Part E——Lessons 33 and 34
The Contracted Brougham and Limousine Doors

(For Working Draft see page 51)

Explanation. Figs. 33 and 34. If the doors are contracted on a body or on landaulets, where the door pillars are cut on the fence rail and turned square with the contracted line, the changes in their position are so important in practice that it is essential that they should be laid out on the draft, as the back door pillars must be pricked off same as the coupé pillars. Suppose the door is contracted after line A B; inclined after line C D, and inside surfaces turned in the direction of E F and G H, the changes of the pillars in a square direction with the contracted line are so great that it turns the vertical door lines into inclined directions. The face of the coupé pillar also turns into a curved line as on line I on coupé pillar and line J on back door pillar; to obtain these curved lines I, J use the following method: Divide the side surface of door from fence rail to base line into horizontal divisions as 1, 2, 3, 4, 5, 6; take amount of turn-under on each division and put it on bottom view marked from 1 to 6; from the intersections outside of coupé pillar line I, Fig. 33, is created by squaring the lines down from bottom view to side elevation.

On rear end the door pillar is turned in the direction of line K, which is square with the contracted line A B. To obtain the amount caused by the turning of the pillars line K is turned in the opposite direction as line L, and the points squared downward on each horizontal division as on coupé pillar, creating line J. This curved line J fits against the straight vertical line of standing pillar, straight across the body; thus the width of the door on bottom curve of door and outside surface is from point M to point N. The changes of the vertical line into the inclined positions are marked on points O, P, Q, for front pillar, and R, S, T, for back pillar on Fig. 33.

The diagram, Fig. 34, is same as Fig. 33, except the door pillars are not square with the contracted line A, B, and the rear surface of coupé pillar, instead of being straight in a vertical direction this surface is curved. This is done to prevent the doors from being a great deal narrower, as shown on M, Fig. 33, and also to obtain more strength on bottom of door pillars.

To do this proceed as follows: Divide the door in divisions, as explained in other diagrams; make line from E to F. If the door is desired one width from top to bottom the door joint is used from which to start the lines. The tangent lines are made, their position depending on the kind of door hinges used. Some hinges require more and others less bevel on the pillar. This holds also good with the amount of contraction, the more contraction the more bevel is required.

The simplest method is to dress the pillar straight across the body and gauge the bevel from that surface. This makes the door one width from top to bottom, but it is not desirable, and the better method is to leave the amount shown on C, Fig. 34, on the pillar, which will create line D.. This represents the old American practice, and it is a very good one, but since the French practice has been adopted the one illustrated in Figs. 31, 32 and 33 has been used.

Problems. Figs. 33 and 34. Cut block the same as explained in problem, Fig. 32.

PART E—LESSON 35 WILL APPEAR IN THE MARCH NUMBER OF "THE VEHICLE MONTHLY.

News in the Trade

Commercial Auto Body Co. Leases Chevrolet Plant

The automobile and truck body building plant now operated by the Chevrolet Motor Company, covering four acres at Broadway and Bulwer Avenue, St. Louis, has been bought "running" by the Commercial Auto Body Company, of which Hugh F. Cartwright is president. The plant has a capacity of 550 bodies a day. The transfer, which includes all machinery, is effective April 1, when the Chevrolet Company expects to be in its new plant at Union and Natural Bridge Avenues, which has a capacity of 1400 bodies a day.

Mr. Cartwright, who was formerly with Russell E. Gardner's Banner Buggy Company, leased the same plant in 1912 for the Banner Buggy Company, and when Gardner began to manufacture the Chevrolet in St. Louis this plant was converted to build Chevrolet bodies. The lease was closed by J. S. Hunt, general manager for the St. Louis Manufacturing Corporation, the General Motors Corporation's St. Louis subsidiary, the Chevrolet being one of the General Motors products.

The Commercial Auto Body Company is now at Sixteenth and Pine Streets, St. Louis, and in its expansion has acquired possession of every possible building in its vicinity. Mr. Cartwright reports an overwhelming demand for motor vehicle bodies. Most of its business is outside of St. Louis.



Cutting & Larson Co., Inc., New York distributors of the Oldsmobile chassis and Babcock commercial bodies, ran a free bus service between Grand Central Palace and the Armory during show week. The bus body, which was indeed a handsome piece of work, was of Babcock make, mounted on an Oldsmobile chassis

Our Cincinnati News Letter

Business with the carriage industry in Cincinnati is very gratifying and there seems to be no cessation of orders for the horse-drawn vehicle. The factories are overwhelmed with business and the most serious question is still pending, and that is the question of getting the various materials.

However, this state of affairs is now a "habit" and the trade is acclimated to these conditions, and the situation is taken as a matter of fact. The carriage makers are doing their utmost to facilitate production.

Prices of all kinds of carriage materials remain firm, and in quite a few instances advances are asked, but the trade is willing to pay almost any price to procure certain material, and in some instances premiums are offered for goods.

Even with this state of affairs, the various material and supply factories have their salesmen on the road who are looking after their customers' needs, and doing all they possibly can to alleviate the situation for the carriage industry.

• • •

Orders are coming in rapidly at the plant of The Trailmobile Company and progress is being made with their new plant in Oakley. The new plant will be the means of an increased production for this popular trailer.

• • •

The Monarch Carriage Goods Company is deluged with business and they are toiling diligently to supply their customers.

• • •

The United States Electrical Tool Co. are enjoying fine trade and they are working hard to keep up with the demand.

• • •

John Creighton, representing the Truscon Laboratories, Detroit, in Cincinnati, is having a very brisk trade.

• • •

The Eagle Carriage Co. are rushed with business and their pony vehicles are finding ready markets.

• • •

O. A. Timberlake, representing the Sheldon Axle & Spring Co. in Cincinnati, reports trade with his company as being exceptionally good.

• • •

The machinery at the plant of The Auto Vehicle Parts Co. is humming with activity. Clarence Rennekamp, the manager of this concern, has been out of the city recently visiting the trade.

• • •

The automobile business in Cincinnati is swamped with orders, especially with the truck manufacturers. Business with them never was better.

The Kelly-Springfield Tire Co. are now nicely situated in their new building on East Eighth Street, Cincinnati.

• • •

Haberer & Co., manufacturers of commercial bodies, are making improvements daily in their various plants, to take care of their increasing trade.

• • •

The business of D. L. Carpenter & Co. has been incorporated and is now known as The D. L. Carpenter Company. Auto and carriage materials is their specialty.

• • •

George S. Brown, of The Brown Carriage Co., is spending the winter months in Winter Park, Florida.

• • •

E. V. Overman, the popular general manager of the Vehicle Spring and Axle Division of The Standard Parts Company, whose headquarters are in the Union Central Building, Cincinnati, reports his concern as being "rushed with orders."

• • •

Trade with the Cincinnati branch house of the Pioneer Pole & Shaft Co., Piqua, Ohio, is very good.

• • •

A. Gruber, manager of the Edward F. Alf Company, states that business with his concern is remarkably good, but that certain kinds of material is very difficult to obtain.

• • •

A. S. Brown, manager of the Summit Thread Co. in the Cincinnati district, is having a phenomenal business. Mr. Brown recently removed to larger quarters, to 128 East 4th Street, Cincinnati.

Horse Publicity Association

The first meeting of The Horse Publicity Association was held at the Hotel Pennsylvania, New York, on Thursday, October 30th, the proceedings of which have just been published and given wide circulation. The object of the association is to promote the breeding and use of horses.

A. W. Tomes, of the Cressona Auto and Wagon Co., Cressona, Pa., was a visitor at the office of THE VEHICLE MONTHLY during January. This company is now building automobile and horse-drawn bodies by the wholesale.

The Yoder Company, Cleveland, Ohio, makers of metal working machinery, have moved their city office from the Engineers' Building to their plant at Walworth Avenue, at Fifty-eighth Street.

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Fully Equipped Trucks

(Continued from page 23)

The foregoing applies equally strong or stronger, to the need for spring trailer drawbars, without which serious damage may result to the rear end of any truck towing another, by reason of distorting rear ends and loosening corners, thus allowing transverse frame action, bending of rear shackle bars, etc.

There is also another very great reason for the addition of that equipment and that is to increase the efficiency and economy of the motor truck as a very modern medium of transportation, by hauling one or more trailers.

The trailer manufacturers have been wide-awake and active; they are educating the truck owner along trailer lines and we are not wise as sales managers if we do not insist on our product being equipped to meet these newer conditions.

Now, just a brief word in behalf of the dealer's interest in this matter and I am done. Would you buy a passenger car stripped and then start all over again and buy top, curtains, electric lights, horn, robe rail, foot rail, extra seats, etc., etc., or would you demand that the dealer price complete such an outfit as you told him you were looking for?

Or, if you were on the dealer's side of the fence, would you like to first sell a man your truck and then go back after perhaps a hard wrestle on the major sale, and have to go all over the case again by selling him piecemeal the things you call extras, but which you know are actual necessities and the lack of which would not enable him to operate his truck as satisfactorily and economically in the long run?

How many dealers are there also, that when it comes to these so-called extras, get full price for them?

Do they not, instead, give many of them away entirely, thus forming only one more avenue for insidious price-cutting and constantly reducing their average margin of profit, a thing we should all labor against his doing, because if the dealer does not make a proper and adequate profit, he will not continue long to handle any line, but *will continue* to change until he finally gives up truck-selling altogether and tackles something else more profitable.

Now, I believe that this association, young as it is, has already impressed much of the automotive trade with their intention and ability to do constructive things for the industry. Therefore, why not rise to the occasion, standardize on what shall constitute a complete motor truck chassis, and thus be the Moses that shall lead the trade out of much of the wilderness of irregularity that has obtained and into the promised land of a more stabilized condition with resulting better profits.

We say emphatically, "don't put off the evil day," if you must call it that, but recognize the changed conditions and necessities of the trade and sell your product fully equipped

U. S. Automotive Corporation

Frank B. Ansted, Connersville, Indiana, president of the Lexington Motor Company, which has its main offices and factories there, has announced the formation of the United States Automotive Corporation, with a capitalization of $10,000,000 of preferred stock and 200,000 shares of no-par-value common stock, under the laws of the State of Delaware. Mr. Ansted explained that the United States Automotive Corporation was a holding company only, and that its subsidiary companies would continue to operate very much as at present and without loss of their corporate identities.

Included in the new corporation are the Lexington Motor Company, the Ansted Engineering Company, the Connersville Foundry Corporation, and the Teetor-Hartley Motor Corporation. With the exception of the last named, all of these concerns are located at Connersville, and all are engaged in the automotive trade. Of the four, the Lexington Motor Company is best known to the public on account of the national and international sale of its product, the Lexington Minute-Man Six. The other three companies are factors in Lexington's activities, however, since all are engaged in the production of important component parts.

Officers of the United States Automotive Corporation have been named as follows: Frank B. Ansted, president; George W. Ansted and Frederic I. Barrows, vice-presidents; James M. Heron, treasurer, and Le-Roy A. Hanson, secretary. All of these gentlemen reside at Connersville, where the main offices of the United States Automotive Corporation will be located.

The other directors are: William B. Ansted, president of the Central Manufacturing Company; Charles C. Hull, president of the Rex Manufacturing Company; John C. Moore, chief engineer of the Lexington Motor Company; Arthur A. Ansted, president of the Indiana Lamp Company, and Emery Huston, vice-president of the Lexington Motor Company—all of Connersville—and Elmer J. Hess, director of the Standard Parts Company, of Cincinnati

Milburn Again in Production

The Milburn Wagon Company, of Toledo, manufacturers of the Milburn electric, again is in production. General Sales Manager E. S. Woodhull, who was in New York attending the automobile shows, announced to the trade generally that the big fire which partially destroyed the company's plant at Toledo, Ohio, caused not more than ten days' interruption in production and practically no interruption at all in deliveries to distributors and dealers.

"We regard the fact that deliveries were not interrupted and that the company is again back into production as truly remarkable evidences of the resourcefulness and elasticity of our organization," Mr. Woodhull said. The Milburn Company seemed to be favored by fate. During the war there was constructed for the Toledo University a four-story brick and concrete building for the training of mechanics for the motor transport corps. This building was modern in every respect.

"Through the keen interest of Mayor Schreiber, of Toledo, the city council and other citizens who look upon Milburn Wagon as one of the real pioneers of Ohio industry, this building, which has not been in use since the armistice was signed, has been turned over to us for a temporary factory.

"While the fire was still raging in the Milburn plant arrangements were made for a full and complete equipment of machinery needed to operate an electric car plant. We did not know at that time how much of our machinery would be saved from the flames.

"This machinery is being installed so rapidly that production has been resumed, giving the Milburn the equivalent of a complete new plant even though it is only for temporary use. But we will occupy this building until the new plant we propose is erected.

"The trim and paint shops, destroyed by fire, have been relocated in temporary quarters and our usual force of workmen is engaged in finishing cars that were not touched by the flames. A large stock of finished and unfinished cars was in the storage building when the fire broke out. As a precautionary measure, the cars were removed. The wisdom of this move was made apparent later, however, for the flames finally reached this building. This stock of unfinished cars is being rushed to completion.

"The Toledo University building which we are now using has railroad facilities and every modern factory convenience. We are rushing our plan for permanent buildings and by March 1 we will be on a 100 per cent. production basis."

An Immense Rubber Shipment

The largest single shipment of crude rubber ever received in this country arrived in New York recently on the steamship Pan America from Rio de Janeiro. The shipment consisted of 3,500 tons of rubber, valued at $7,916,000, and was consigned to the United States Rubber Company.



Some idea of the vastness of the shipment may be gained when it is stated that the 7,916,000 pounds of rubber is equal to a year's production from 1,600,000 trees or from the yield of 16,000 acres of plantation.

Although the rubber will be used for various purposes, it would be sufficient for the manufacture of about 700,000 tires.

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Garford's Capital Stock Doubled

President E. A. Williams, Jr., of The Garford Motor Truck Company, with factories at Lima, Ohio, has announced that the capital stock of the company has been increased from five to ten million dollars to provide for an extensive program of expansion. This expansion is necessary to meet the increased demands for the Garford product. It will provide for an increase in production which within the next year, it is expected to be greater by 100 per cent. than the present program.

While the detailed plans for expansion are not as yet complete, it was stated that one of the company's first moves will be to erect a modern addition to its factory, 400 feet by 100 feet. This building will be devoted entirely to the progressive assembly of Garford motor trucks. By the installation of the latest type of machinery and the adaptation of special assembly methods, the Garford not only intends to maintain its present high standards of manufacture, but will materially increase its output and at the same time keep the cost of production at the minimum.

Goodyear's Rubber Plantation "Movies"

The hand of commercial enterprise in American industry is reaching out to bring closer countries that the average person knows little about. Already the South American countries have been linked with America, while South Africa, China, the Straits Settlements, Japan and India are producing raw materials vitally essential to American industries.

To assure permanent and sufficient supplies of raw materials, American capital has reached into the heart of the Dark Continent and has penetrated the jungles to clear the ground for modern cultivation. What was impenetrable forest a few years ago is now accessible to railroad and automobile transportation—garden spots where Europeans may live as comfortably as in Maine or California.

A notable example of this commercial enterprise is the 30,000-acre rubber plantation of The Goodyear Tire and Rubber Company in Sumatra. To visualize the preparation of this commodity for the market and to show the company's pioneer work, Roswell Johnson, noted cameraman and director, has just returned to the United States after many months' stay, with 30,000 feet of film for educational purposes. Taken in the sunlight more brilliant than that of California, the pictures show vividly the results of American commercial enterprise on the other side of the globe. Every phase of tropic island life and the development of jungle into civilization are interestingly pictured. W. A. M. Vaughn, Goodyear representative, who five years ago went to Sumatra and produced rubber where before the creatures of the wild roamed unmolested by man, also accompanied the cameraman on the trip.

Brazilian Editors "Discover" the Automobile

Few persons would undertake the task of molding the thought of an entire nation along new lines, but such things do not daunt W. C. Holmes, manager in Brazil for The Goodyear Tire & Rubber Company of South America.

When he took over his duties in the South American republic, he found that the Brazilian press had never made any attempt to devote thought or space to the general development of automobile transportation. Special auto pages or sections were unknown—so Mr. Holmes decided to start something.

First he visited the owner and editor of Brazil's foremost newspaper and pointed out some American achievements in transportation and automobile development. He called attention to the fact that Brazil has mineral wealth beyond imagination, that it furnishes foodstuffs to many countries, and that its industries export quantities of manufactured articles. It also has gold in untold quantities. All that is needed for phenomenal development is to bring export goods to the seaboard quickly and cheaply.

The Brazilian editor proved quick in grasping the idea and in a short time the first automobile section ever printed in Brazil was issued in Rio Janeiro. More than that, the paper is the first to employ a man exclusively on auto news and sports.

The idea spread—with the result that another Rio Janeiro paper is soon to publish a similar section. Mr. Holmes is contributing to both—has made the Goodyear branch the heart of "Automobile Row"—and stimulated national enthusiasm over the part of automobile transportation in the future of Brazil.

1920 Piston Ring Directory Free

One of the most complete piston ring directories ever published has just been issued by the Burd High Compression Ring Co. It is a book of 112 pages, 4 x 6¼ inches in size, with an attractive cover design in four colors, and substantially bound in stiff covers. Over 600 sizes and oversizes of Burd High Compression Piston Rings are listed in the new Directory, a size for practically every make and model of gasoline engine. Piston ring specifications for over 1,500 models of automobiles are given. The correct size of piston rings required for nearly every automobile, truck, tractor, airplane, hydroplane, motor boat and motorcycle engine, can easily be found by referring to the index, which makes this new directory very convenient and practical.

In addition to the tabulation of sizes, the book contains complete instructions for the installation of piston rings, information regarding oversizes, and scores of helpful hints and suggestions about motor troubles, elimination of carbon, U. S. official millimeters conversion table, decimal equivalents of fractions, etc. A copy of this helpful book will be mailed on request to any garage or repair shop by the Burd High Compression Ring Co., Rockford, Illinois.

The New Moreland Six

Announcement is made that the Moreland Motor Truck Co., Los Angeles, Calif., will undertake production of a passenger car as well as a field tractor.

The company now has under construction at Burbank a new factory building, and it is said the intention is to use the present factory in Los Angeles as a service and sales station in the future and do all the assembly work at the Burbank plant. If the plans as drawn up are executed completely the Burbank factory will provide ample room for both the passenger car and tractor departments

Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

PAINTING PROBLEMS SOLVED. Expert advice on paint shop methods, materials and equipment. Can save time, reduce cost and make some difficult operations easy. JOHN HALL, formerly foreman expert with Stevens-Duryea, Locomobile, Knox, etc. Address HALL'S AUTOMOBILE PAINT SHOP, West Springfield, Mass.

FOR SALE—Elliott Dash Stitching Machine. Address E. B. GAUMER & SONS, Urbana, Ohio.

WANTED.—A man capable of supervising the assembling, painting, and trimming of closed automobile bodies. Must have practical experience on framing and application of metal to frame, etc. Address "789," care THE VEHICLE MONTHLY, Philadelphia.

FOR SALE.—We have for sale a quantity of S. A. E. bands, all popular sizes. Make us an offer. HERMAN HORN & SONS, Inc., Fremont, Saratoga and Wroesche Sts., Baltimore, Md.

WANTED.—Automobile body lay-out man, must be experienced, familiar with both open and closed body work. This position will lead to superintendency for the right man. Address "785," care THE VEHICLE MONTHLY, Philadelphia.

WANTED. Traveling man to handle our spring wagons and carts on commission as a side line in Ohio, Tennessee and Kentucky; also in all the New England States. Address "795," care THE VEHICLE MONTHLY, Philadelphia.

SUPERINTENDENT for progressive Minnesota top and body shop, building custom hearse, pleasure and truck bodies and a large general body repair and painting business. Must be a high-grade experienced man and one who can secure and hold the confidence of the trade. Address "790," care THE VEHICLE MONTHLY, Philadelphia.

WANTED. Position as auto body engineer. At present employed as engineer. Can furnish best of references. Address "770," care THE VEHICLE MONTHLY, Philadelphia.

WANTED HIGH-GRADE EXPERIENCED MAN TO SELL FULL LINE OF AUTO TRIMMING GOODS. SALARY AND COMMISSION. SPLENDID FUTURE. DO NOT APPLY UNLESS YOU REALLY KNOW THE FULL LINE AND CAN BUILD BIG SALES. ADDRESS AUTO EQUIPMENT COMPANY, DENVER, COLO.

WANTED. Automobile and car body builders to work on commercial and bus bodies. Good wages to right men. Address "726," care THE VEHICLE MONTHLY, Philadelphia.

FOR SALE. White oak wagon poles, 3 x 4 in. butt, 3 x 3 in. point, 12 ft. lengths. F. P. HOWN MFG. HOUSE, Box 560, Pittsburgh, Pa.

WANTED.—Foreman carriage trimmer. Factory in Central West City, 20,000. Address "710," care THE VEHICLE MONTHLY, Philadelphia.

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The MILLER DISAPPEARING CHAIR

An auxiliary seat that adds classiness to the car and provides greater comfort and safety for the passenger.

Illustrations show it in both collapsed and upright positions.

Notice how completely it folds out of the way.





Producing it in large quantities, we are enabled to furnish the Miller Chair at a figure that

WILL AGREEABLY SURPRISE YOU

—

Write for blueprints and full particulars

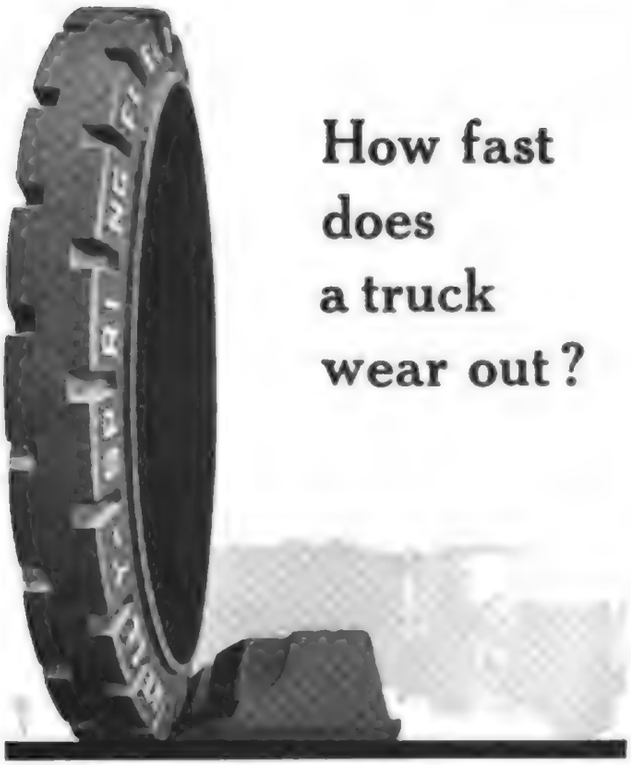
—

T. MILLER

1973 West 100th Street

CLEVELAND, OHIO

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How fast does a truck wear out?

IF A TRUCK were jacked up off the ground and the engine used merely to transmit power to some machine, it would take years to wear out the motor.

It isn't the running of a truck engine that wears it out. It's the pounding it gets from road shocks.

The life of a truck is very largely dependent upon the resiliency of the tires it rides on.

Fleet-owners who have put Kelly Caterpillars on their trucks tell us that the trucks now spend their time on the road instead of in the repair shop. The reason is simply that Kelly Caterpillars have an unusual depth of rubber and a system of side vents that doubles their resiliency.

Kelly-Springfield Tire Co.

GENERAL SALES DEPARTMENT

4614 Prospect Avenue, Cleveland, Ohio

KELLY SPRINGFIELD TRUCK TIRES



The Advantage to Dealers of 20 Years' Experience

The Gramm-Bernstein dealer does not have to waste time in the slow, tortuous process of disarming sales resistance.

He does not have to submit comparisons of price or comparisons of merit.

The Gramm-Bernstein line includes certain exclusive and basic advantages of construction, any one of which justifies its price.

Taken altogether, they set Gramm-Bernstein quite apart from comparison or competition.

The reputation of B. A. Gramm for initiative and constructive improvement in motor transportation dates back twenty years.

His inventive genius is responsible for basic improvements that have long been accepted standards of the industry.

The very last and highest developments of his unique engineering experience are presented in the Gramm-Bernstein truck.

Years of better performance and better service are the biggest selling factors in the Gramm-Bernstein. This is established by the extraordinary percentage of re-orders.

Let us show you how Gramm-Bernstein prestige is continually helping its dealers to easier and more profitable sales.

Gramm-Bernstein Worm-Drive Trucks in 1½, 2, 2½, 3½ and 5-ton capacities, are now sold completely equipped, ready for the body—not an extra to buy.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194894.

The Gramm-Bernstein Motor Truck Co.

Pioneers since 1901—Builders of the First Liberty (U. S. A.) Truck

Lima, Ohio, U. S. A.

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Hickory and Goodyear



BEST hickory, air dried and thoroughly seasoned. These are your specifications for spokes and wheel rims.

The reputation of your firm, the performance of your vehicles depends on using best, thoroughly seasoned hickory.

So, in tires it is just as logical, it is just as important for you to specify and use Goodyear Tires.

As logical and as important, because the long life of your vehicles depends *also* on the amount of cushioning secured from the rubber tires.

As logical and as important, because the individual buyers of your vehicles believe in and want Goodyear Tires.

They know from experience, know from Goodyear advertising, that Goodyear Carriage Rubber is resilient and comfortable, that it wears a long time.

GOODYEAR

ILLINOIS IRON & BOLT CO.

Manufacturers of

HIGH GRADE

Steel Axles and Wagon Castings

Ball Bearing Trailer Axles with Interchangeable Sarven and Artillery Hubs

Write for Particulars

ILLINOIS IRON & BOLT CO.
CARPENTERSVILLE, ILL.

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SPECIALTIES IN STEEL

SPECIAL PRODUCTIONS DEPARTMENT

WHAT IS THIS DEPARTMENT? In reality not a department at all—but a plant in itself where special Steel Stampings, drawings and formings are made just as you make your product.

With its own general manager, sales manager, production man and office force, this department has all the facilities for "carrying on" work, starting with close co-operation with the customer to a finished product as the customer wants and at volume prices.

Remember, altho this is called our "Special Productions Department" it has the floor space and capacity of a good sized factory.

Write to Mr. V. M., care of this department.

SPECIAL PRODUCTIONS DEPARTMENT
THE STANLEY WORKS
NEW YORK — NEW BRITAIN, CONN. — CHICAGO.



Hand Hoist for Ford Truck
(Patents Pending)

TAKES no room back of cab, is easy of operation, simple and neat in appearance.

Shipped on sub-frame, ready for mounting on chassis. Easiest for the body builder to install and best—because it always makes a satisfied customer.

Write for photos and blueprints.

Truck Engineering Company
7031 Broadway
CLEVELAND, OHIO

FORGINGS
OF GUARANTEED ACCURACY

For Automobiles, Motor Trucks and Special Work

We also make a large line of Drop Forged Carriage and Wagon Hardware

OUR MOTTO:
HIGH GRADE WORK AND PROMPT SERVICE

Send your Models or Blue Prints for Quotations
Write for our Latest Catalogs

RICHARD ECCLES COMPANY
FOUNDED 1880
AUBURN, NEW YORK

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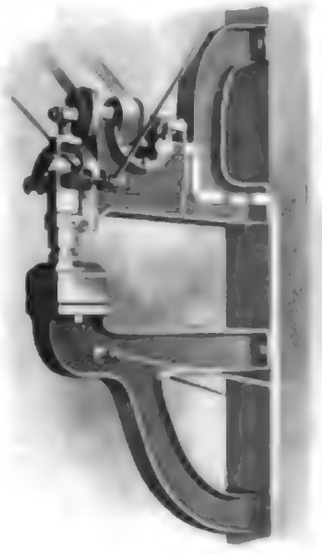


Most Miles per Dollar

JUST as you weld the wires together so you can fasten your trade tight to your shop by applying Firestones. The reason is in the rubber. If you have not used it you and your trade are losers. Write for information.

FIRESTONE TIRE & RUBBER CO., Firestone Park, Akron, Ohio
Branches and Dealers Everywhere

Firestone Carriage Tires



USE THE STANDARD AUTOMATIC HAMMER

For hammering into shape all panels, doors, hoods, roofs, fenders, etc. This hammer is recognized as the STANDARD machine on the market for automobile body work and for all metal work.

Send for catalogue

PETTINGELL MACHINE COMPANY

AMESBURY, MASSACHUSETTS

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QUICKWORK

Registered in U. S. A. and Foreign Countries

ROTARY SHEARS

MADE IN 7 SIZES

Cut All the Sheet Metal Parts for Automobiles and General Sheet Metal Work



SAVES

Labor
Material
Investment
Floor Space
Power Bills
Tool Expense
Increases Output
Improves Product

QUICKWORK ROTARY SHEARS are used all over this and foreign countries by the largest manufacturers of Automobile Sheet Metal Parts

WRITE FOR CATALOGUE No. 60

THE QUICKWORK COMPANY ST. MARYS OHIO, U.S.A.

Cable Address "QUICKWORK"—Codes: W. U. and GENERAL

Trailmobile

Trade-Mark Reg. U. S. Patent Office

The Motorless Motor Truck

Thousands in Use

DIVISION 1
Light four-wheeled Trailmobiles for use with passenger cars or light trucks: 1,250 lbs., 1,500 lbs. 2,000 lbs.

DIVISION 2
Heavy duty, four-wheel Trailmobiles for use with trucks: 3,000 lbs. Non-reversible; 4,000 lbs., 7,000 lbs., 10,000 lbs., Reversible.

DIVISION 3
Trailmobile Semi-trailers: 3,000 lbs. 6,000 lbs., 10,000 lbs.

Bodies for every business

Why the Profit is Good!

THE Trailmobile is the best trailer mechanically, the best known and best advertised one.

The line is most complete, including light Trailmobiles, heavy reversible four-wheeled Trailmobiles, and semi-trailers.

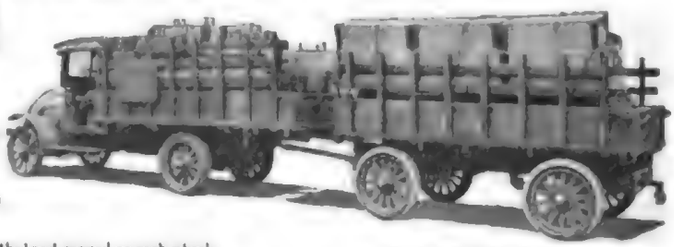
The dealers margin is about the same as that on the leading trucks. There is practically no service expense after the sale. So few replacements are required no stock of spare parts need be carried.

The dealers profits from Trailmobile sales are real profits. The line costs little to handle.

Write for literature and dealer's proposition.

The Trailmobile Company
502-522 E. Fifth St.
Cincinnati, Ohio

Contractors to the United States Government

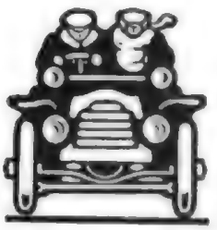


3½-ton Reversible Trailmobile

Good roads are preserved by reducing the load carried on each wheel.

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ALUMINUM



for

AUTOMOBILE WORK

SHEETS
MOULDINGS
EXTRUDED SHAPES
RODS
TUBING
INGOTS
WIRE
RIVETS

furnished according to your specifications

"Everything Aluminum"

Aluminum Company of America

Pittsburgh ~ Penna.

BRANCH OFFICES IN ALL PRINCIPAL CITIES

"SEARS-CROSS LOCK"

"The Lock with the Expanding Latch"
(MANUFACTURED UNDER THE OTTINGER PATS.)

Prevents Rattling of Doors

Overcomes Present Difficulty in Opening and Closing of Doors



Insures Positive Safety Protection Against Doors Opening Accidentally

Automatically Takes Up Wear

Made for all priced cars, open and enclosed bodies

SEARS-CROSS CO.
BUSH TERMINAL, BROOKLYN, N.Y.



The Perfect Window Regulator is Standard Equipment on all Fine Cars

For the past ten years automotive engineers and body builders have been specifying Perfect Window Regulators to complete the appointments of ultra-designed coach interiors.

The best evidence of the superiority of Perfect Window Regulator is the fact that it is accepted as the world's standard for efficiency and reliability because of its dependable performance under all kinds of operating conditions.

The Regulator is simple in construction. One of its many distinctive features is that the counter-balancing spring can be adjusted to meet the operating requirements without removing the regulator.

This feature appeals to all body builders from the standpoint of installation.

Install the Perfect Window Regulator on all the coach windows. Write for our catalog, showing installations.

PERFECT WINDOW REGULATOR CO.
20 EXCHANGE PLACE, NEW YORK CITY

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One Bad Nut Can Mar a Good Reputation

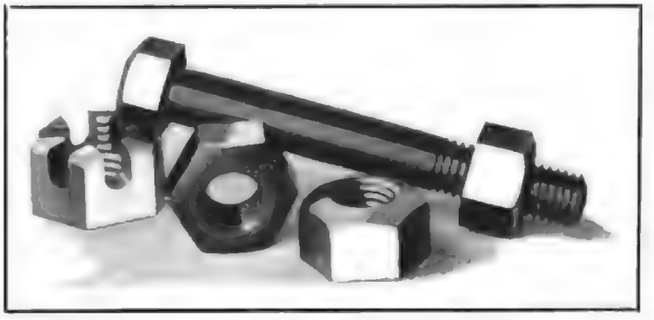
TO guarantee a product as a whole is to guarantee everything that enters into its construction.

This means that you stake your reputation on the enduring quality of every part—every bolt and nut that helps maintain the integrity of the united assembly.

So it is important that you use only such bolts and nuts as demonstrate their fitness to be given a place on the product that bears your name.

EMPIRE Bolts and Nuts are known the world over for their exceptional quality—their durability, accuracy and finish; the marks of high grade materials and fine workmanship. You can **trust** them—you are relieved from all doubt or anxiety as to whether they will **hold,** whether there is any chance of fracture, stripped threads, slipping. They are always 100 per cent. right.

When you specify EMPIRE you procure the benefit of 74 years of bolt and nut making—a safeguard too valuable to be overlooked.



RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY

PEMBERWICK, CONN PORT CHESTER, NEW YORK ROCK FALLS, ILLINOIS

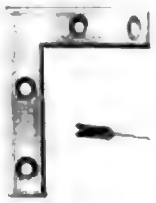
Makers of Bolts, Nuts and Rivets Since 1845

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E

IRONS NEEDED IN THE CONSTRUCTION OF THIS BODY

Size A, Straight End			Size B, Curved End	
1 set	No. 5692	Acme Door Lock	1 set	No. 5692
6 pieces	9515-E	Door Hinges	4 pieces 2 pieces	9515-E 9515-H
1 pair	6137-A	Rear Post, Inside Body Braces	1 pair	6136-A
6 pieces	6135-C	Side Post, Inside Body Braces	6 pieces	6135-C
6 pieces	4426-D	Roof Rail Corner Irons	6 pieces	4426-D
1 pair	6220-B	Rear Post, Top Rail Corner Irons	1 pair	6220-B
2 pieces	4380-B	Top Rail Corner Plates, front	2 pieces	4380-B
4 pieces	4485	Body and Chassis Connections	4 pieces	4485


No. 4380


No. 9515


No. 4485


No. 4426


No. 6220

EMCO MALLEABLE IRONS

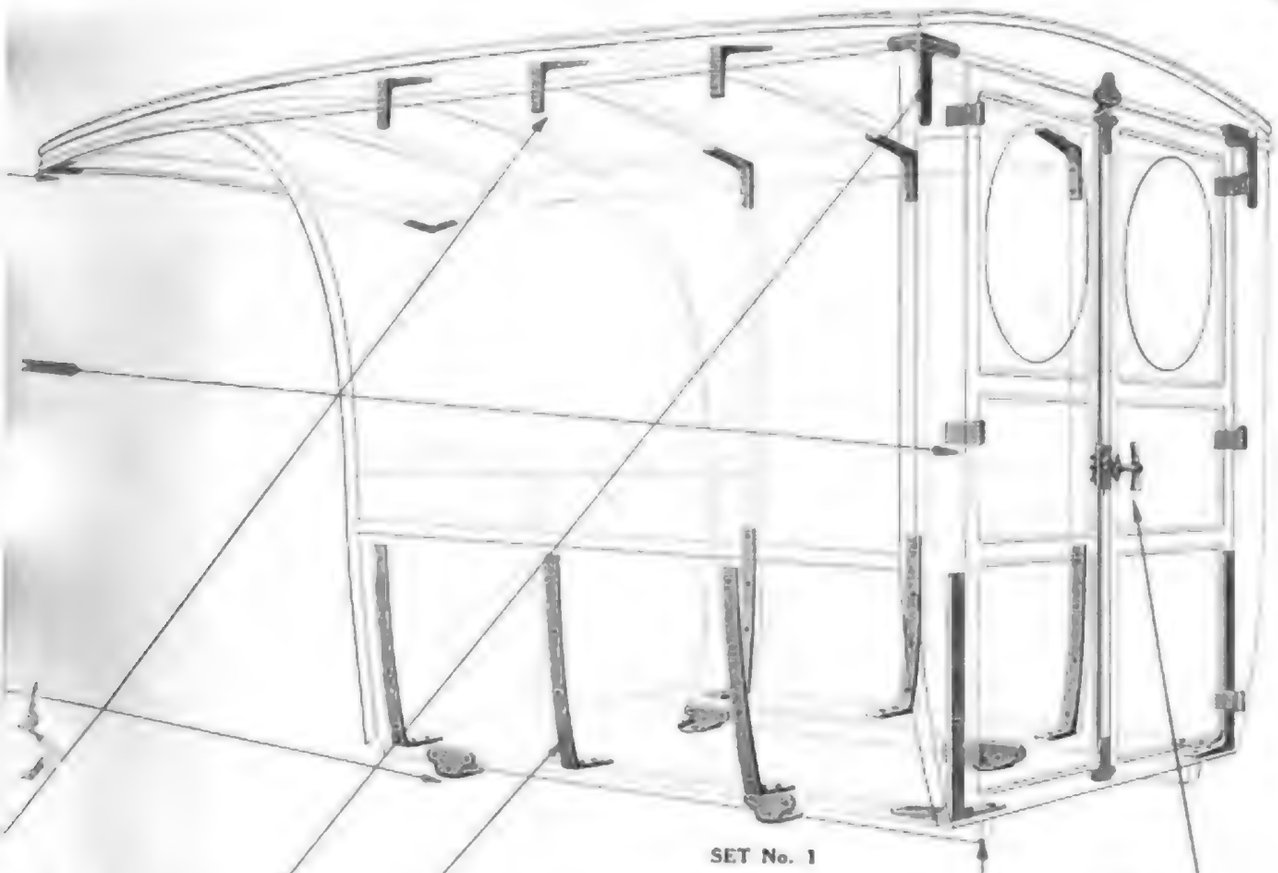
Write for our Bulletin
"ASSEMBLIES OF IRONS"

This page illustrates one of these assemblies, showing our stock irons and their application on a standard job.

The Eberhard Manufacturing Company

CLEVELAND, U. S. A.

Google



SET No. 1

FULL PANEL BODY, CURVED SIDES

BODY TO FIT ON REAR OF FORD ROADSTER BODY



No. 6135

No. 6136

No. 6137

No. 5692

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BYRON LEATHER

for Automobiles



W. D. BYRON & SONS, INC.
Oak Tanners
Williamsport, Md.

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Profits are Payment for a Service

An Important Service Rightfully Brings Big Profits

The distributer of Motor Truck Bodies and Hoists today is performing an important service. States and counties all over the nation have thousands of War Trucks on hand--all without dump body equipment--all urgently needed for road construction ***now***.

The distributer who helps get these trucks into action by supplying "K. & J." Standardized Motor Truck Bodies and "K. & J." Hand and Power Operated Hoists is performing a big service. A service that is ***profitable***.

If you are equipped to act as a distributer of "K. & J." Dumping Equipment--if you have the plant facilities, the trade acquaintance and the financial resources to perform this service as this big occasion demands, don't overlook this opportunity.

It is an opportunity for immediate profit--a profit which is well earned, but large enough to establish you as a distributer of "K. & J." Dumping Equipment for normal commercial business after the present big emergency is over, and leave a nice margin besides.

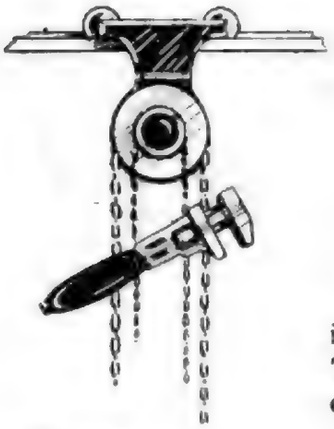
The distributer of "K. & J." Dumping Equipment for the normal commercial trade offers a big future for the right organization. A huge commercial demand is now in sight for 1920, and 1920 sees the commercial dump truck business still in its infancy.

TRADE MARK REGISTERED

The Kilbourne & Jacobs Mfg. Co.
Columbus, Ohio, U S. A.

TRADE MARK REGISTERED
THE SEAL OF SATISFACTION
K&J

OVER



"K & J" Standardized Dumping Equipment is an Ideal Proposition for the Distributer

It is designed, standardized and built by a large organization capable of far-reaching co-operation with you. The mechanical features of the "K & J" proposition are excellent.

The mounting of "K. & J." Standardized Bodies is a very simple process requiring very simple equipment



United States Truck–Type "Quad" (In Partial Dumping Position)

Equipped with "K. & J." Hand Hoist and "K. & J." Standardized Dumping Bodies.

Mounting a "K & J" Standardized Body is a simple, quick operation ---not a factory process.

The "K. & J." Adjustable Underframe is supplied attached to all "K. & J." Standardized Bodies. This includes all wood sills and fasteners--everything above the chassis frame and back of the hoist.

A simple, hand adjustment fits this underframe to any width chassis. A similar forward and back adjustment provides for clearances.

"K. & J." Vice-Grip Bolt Clamps are used for attachment to chassis frame on all smaller capacity bodies and can be supplied for all types.

A complete variety of body sizes and types are provided for hauling different classes of loads such as coal, asphalt, garbage, etc.

The Kilbourne and Jacobs Mfg. Company

NEW YORK
120 Broadway

Columbus, Ohio, U. S. A.

ADDRESS
Dept. 013M

The Distributer can Stock these Bodies and either Equip New Trucks or Mount New Bodies on Old Trucks at a Minimum of Labor Cost and a Maximum of Profit

If your idea of the bulk of such a stock is based upon your idea of the ordinary motor truck body--cut it practically in half. "K. & J." Standardized Bodies nest one within the other.

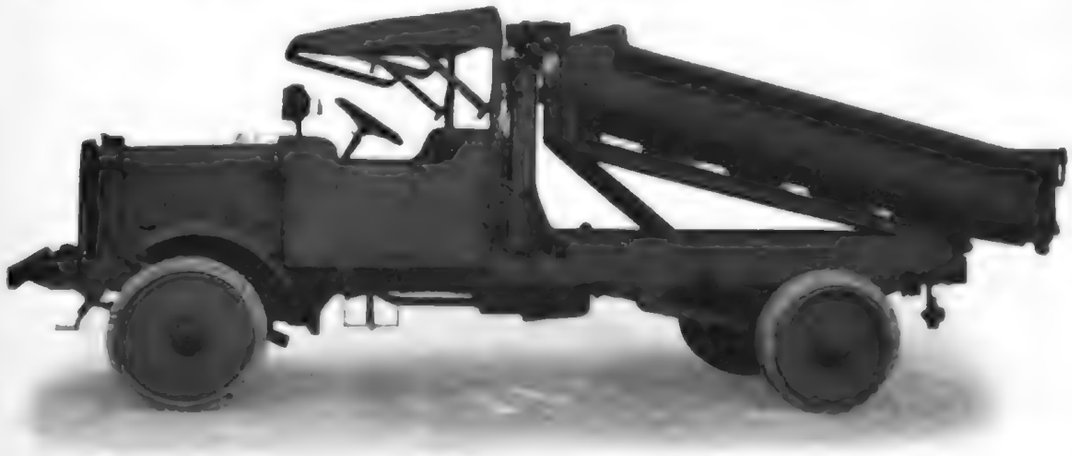
Read the distinguishing advantages of "K. & J." Standardized Bodies on page 4 of this insert.

You will require hoists to complete your line. We supply the "K. & J." Hand Hoist and the "K. & J." Light Automatic Power Hoist for bodies carrying loads up to two tons, and the "K. & J." Giant Lift Automatic Power Hoist for the heavier mountings.

"K. & J." Hand Hoists are simple, rugged and easily operated, and are in big demand for the lighter state and county mountings today. Their satisfactory service is being demonstrated to thousands of contractors through this channel alone.

"K. & J." Power Hoists are sure, safe, lifting units. They do not depend upon a pump nor upon any liquid. Temperatures do not effect their operation--they are all-climate equipment. They have no extending members--no piston movement but are low, rugged and powerful.

In the knowledge that the mightiest lifts have always been made by mechanical means and through immediate mechanical contacts "K. & J." Hoists were developed. And it is a significant fact that among the largest, oldest and most successful motor truck manufacturers there are those using the mechanical hoisting principle exclusively.



United States Truck--Type "Heavy Aviation" (In Partial Dumping Position)

Equipped with "K & J" Automatic Power Hoist and "K & J" Standardized Steel Dumping Body

TRADE MARK REGISTERED

The Kilbourne and Jacobs Mfg. Company

NEW YORK 120 Broadway

Columbus, Ohio, U. S. A.

ADDRESS Dept. 013 M

THE SEAL OF SATISFACTION K&J

(OVER)

The Advantages of "K. & J." Dumping Equipment Are Important--Study Them

1. Power Hoist is driven from "sliding jaw" clutch on propeller shaft through a chain. Rugged, simple, positive, controlled by lever easily reached from driver's seat.

2. Malleable bracket on hoist base provides means of quickly riveting hoist to chassis frame.

3. Hoisting arms shipped attached through rugged brackets riveted to lower front corners of body and to front I-Beam cross-member. Arms fold flat under body. In dumping they travel rails leading up hoist columns. No stiff arms projecting below top of chassis frame to cause trouble in dumping on uneven ground.

4. Power hoisting mechanism automatically disengages at total lift and total descent. Can disengage manually at any desired angle up to 45° worm lock holding body without brakes or clutches. Can be re-engaged for travel either up or down. Driver may start with body at full dump. Hoist will lower body and disengage with truck in motion. Entire mechanism housed in bath of oil. No pumps, cylinders or pistons. Hence small upkeep cost.

5. Overall hoist height always low--no rising members Cable winds on grooved drums applying lift at lower, front body corners, first directly then through hoisting arms practically eliminating back pull on hoist.

6. Partial dumping tail-gate control, manually operated from drivers seat allows "spreading" load with truck moving. Quadrant at handle is ratcheted. Control lever engages any notch to regulate tail-gate opening.

7. Body splendidly fabricated. Lower inside corners rounded--no clogging and consequent rust. All inside rivets countersunk. Sides flared for extra strength and front crowned avoiding spill upon hoist or chassis. High hinged tail-gate for ample dumping clearance.

8. Rigid and adjustable underframe permits quick fitting to any width chassis frame without shop process.

9. Deep oak "cushion" sill strengthens frame and provides buffer against body--also takes away certain vibration strains from motor, transmission and axle.

10. Stout hinges provide rigid attachment of dumping unit to truck frame at rear and tend to prevent side-sway in dumping.

An extraordinary opportunity to take up a new, quick turnover, highly profitable line if offered you--one that is closely allied to your present business. One that has the backing of a big organization and big facilities ensuring you of thorough co-operation in selling as well as production.

Write us for the details that will convince you that if you have the organization to handle it you should apply for the line ***now***.

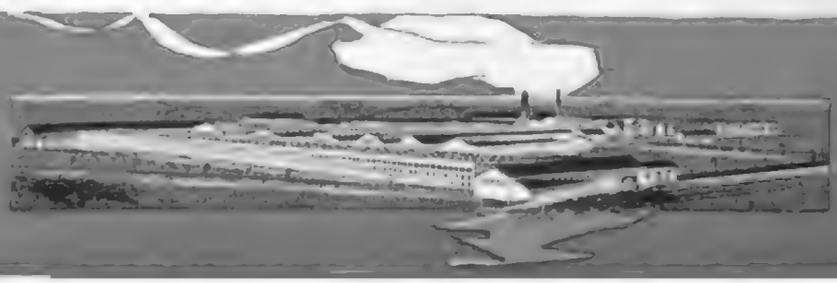


"K. & J. Dumping Equipment is being widely advertised to the consumer. The advertisements reproduced here are "inserts" in color being run in many widely read engineering and contracting publications.

The Kilbourne and Jacobs Mfg. Company
Columbus, Ohio, U.S.A.

NEW YORK
120 Broadway

ADDRESS
Dept. 013 M





Wherever the smoothly gliding car of elegant distinction is seen—there too are

SOSS INVISIBLE HINGES

Refinement of body design depends upon beauty of line. The unbroken beauty of line requires Soss Hinges.

Soss Hinges are mechanically accurate. They insure

Flush Doors, Clean Lines, No Projections

Catalog "B" and discounts on application.

SOSS MANUFACTURING Co
GRAND AVE & BERGEN ST BROOKLYN, N.Y.

Drafting Supplies

We manufacture a full line of high grade supplies made under our own supervision. We know they are right.

Quality Plus
and at prices that appeal.



A Specialty—

Our

MONROE Drawing Table

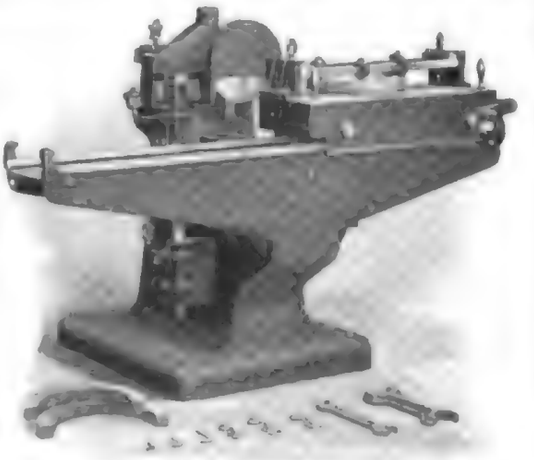
A table of general utility made after our own ideas. Stands rigid and lasts a life time.

Let us quote on your needs. Ask for catalogue No. "T"

New York Blue Print Paper Co.

102 Reade Street NYB New York City

Steering Wheel Rim Equalizer and Jointer



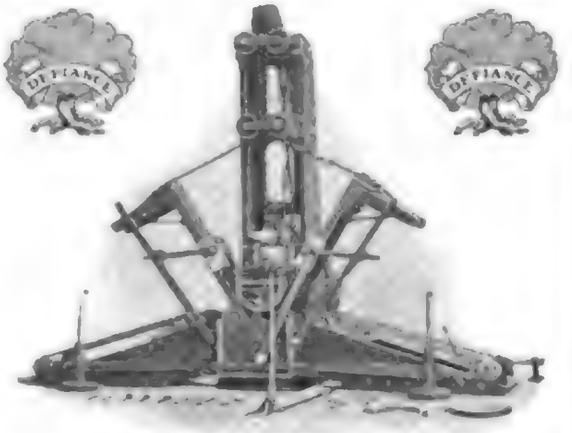
DEFIANCE

STEERING WHEEL RIM MACHINERY

There's a Defiance machine for every operation necessary to make steering wheel rims. Beginning with blanking the stock—it bends the half rim sections—equalizes and joints the half rim sections—shapes the jointed rim—scrapes and polishes the shaped rims.

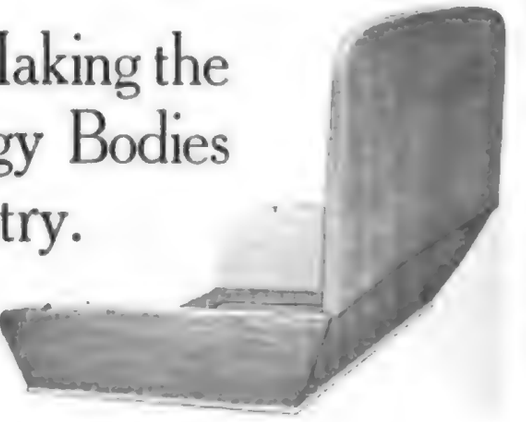
Each machine is of a special design, which in use has proven itself successful by accomplishing its respective operation accurately with a big daily out-put, and in addition reduces material wastage to a minimum. These machines are illustrated and described in circulars, which we will mail on request.

THE DEFIANCE MACHINE WORKS
Defiance, Ohio, U. S. A.
NEW YORK *LONDON*



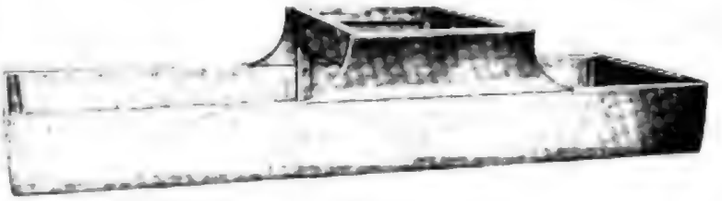
Steering Wheel Rim Bending Machine

We Have the Reputation of Making the Best Automobile Bodies, Buggy Bodies *and* Buggy Seats in the Country.



Our Products are Quality. Deliveries Always Prompt and Our Prices Attractive

We Solicit Inquiry and Will Quote Promptly



Ames Body Corporation
INCORPORATED
Successor to CARRIAGE WOODSTOCK CO.
Owensboro - Kentucky

Dealers Here's a Winner

The hand operating device, quick action and excellent construction of the

JENNINGS PATENT AUTOMATIC DUMP BODY

Make it a real interesting seller

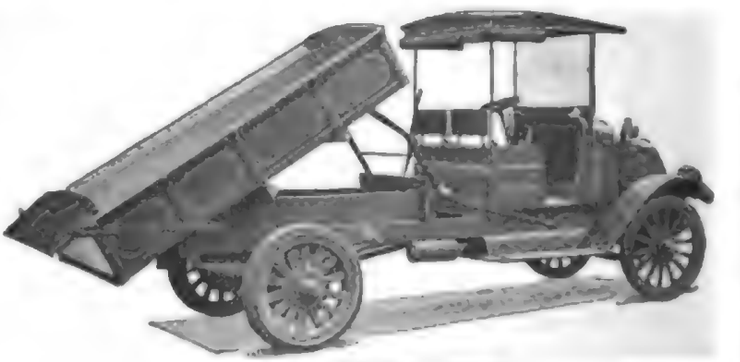
No expensive or intricate hoists to take up valuable room or cause trouble.

A very clever but simple lever device enables one man to dump the load in ten seconds.

An automatic locking device prevents body from dropping back.

We build this body for any make of chassis in capacities from one to four yards.

Write now for catalog and agency for your district



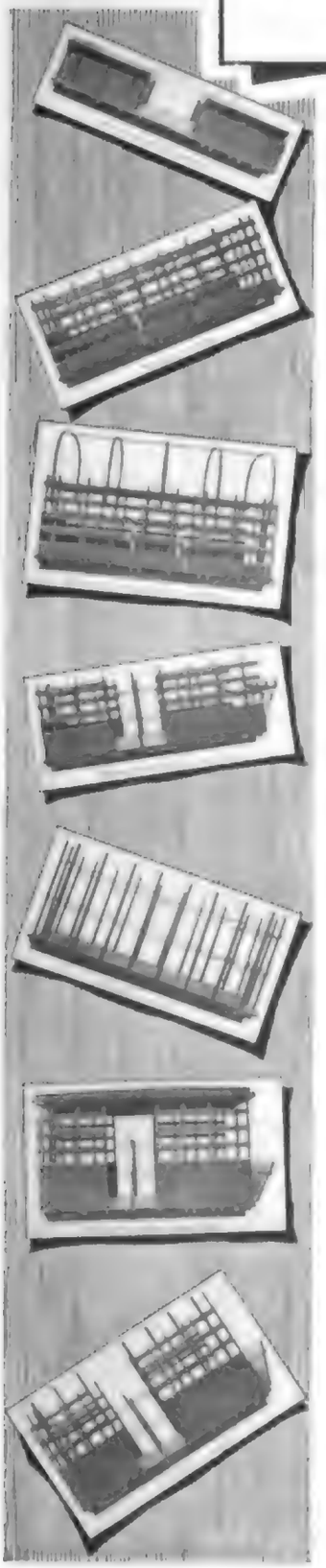
SHOWING BODY WHEN DUMPED

THE COLUMBIA WAGON CO., Columbia, Pa.

Digitized by Google



BODY No. 160—PLATFORM ONLY



1 Platform with Interchangeable Units Makes 15 Different Style Bodies

All these styles in 6 different length platforms suitable for chassis of from 1 to 5 tons capacity.

That's your big talking point when you handle

Mulholland Truck Bodies

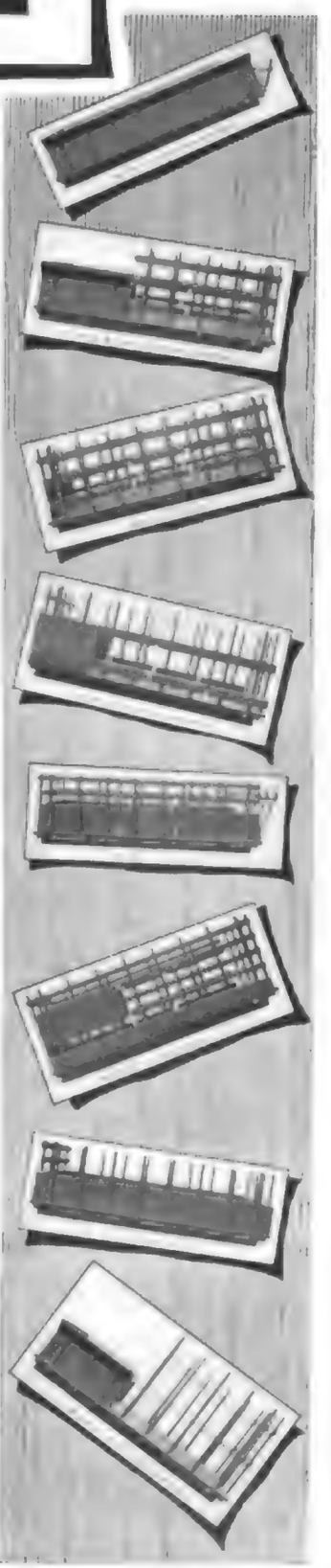
They are built with the idea of quality first. The platform is constructed throughout of the highest grade ash and oak. It is thoroughly ironed at all essential points. All floor irons are bolted to bottom instead of being screwed on. The ends of the floor irons are offset and run under the scuff irons, providing a smooth surface and making it impossible for the end to lift up. In every respect Mulholland Bodies are built to withstand severe service.

There is a Big Business for You in the Distribution of Mulholland Bodies in Your Territory. Write for Catalog No. 10

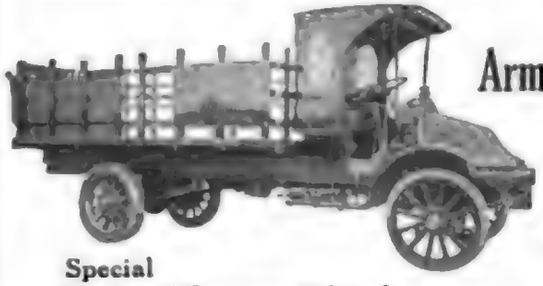
THE MULHOLLAND CO., DUNKIRK N. Y.

Distributing Points

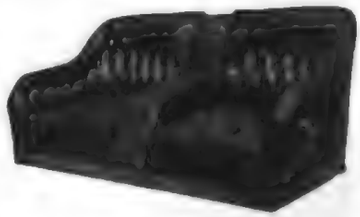
New York City, 115 W. 54th St. Cleveland, O., 3533 Cedar Ave.
Buffalo, N.Y., 1043 Jefferson St. Richmond, Va., 210 N. Madison St

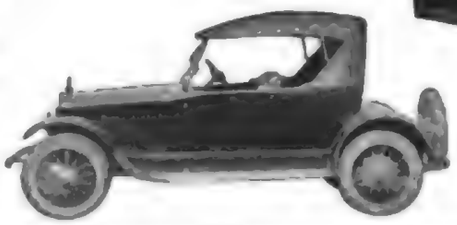


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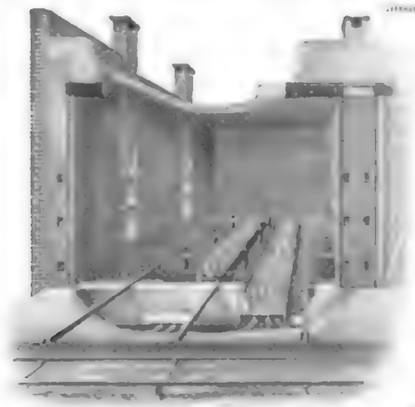
THE
Armstrong-Johnston Mfg. Co.
COLUMBUS, OHIO





Special
Designed Commercial and
Pleasure Car Bodies
Send blue prints and specifications for estimates

TRUCK SEATS
SEAT BASES
CAB TOPS



"Perfectly Dry and Straight as a Die"

That's the condition of stock when it's taken from the

NATIONAL DRY KILN

It dries Oak green from the saw, also hickory, ash, pine, poplar and all other hard and soft woods. *Write for Catalog.*

THE NATIONAL DRY KILN CO. 1200 E. MARYLAND STREET INDIANAPOLIS, IND.

VENEERED ROOF PANELS

for Closed Body Construction

GLUED WITH WATERPROOF GLUE or HIGH GRADE HIDE GLUE

Wagon Side Panels
Dash Boards **Marqueterie Panels**

ROOF PANELS MADE WITH FIFTEEN DIFFERENT SWEEPS IN LENGTH AND WIDTH

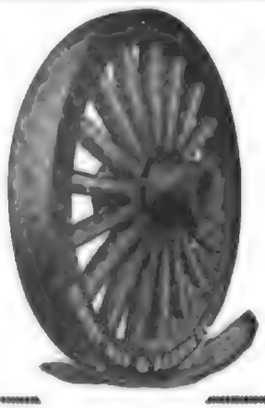
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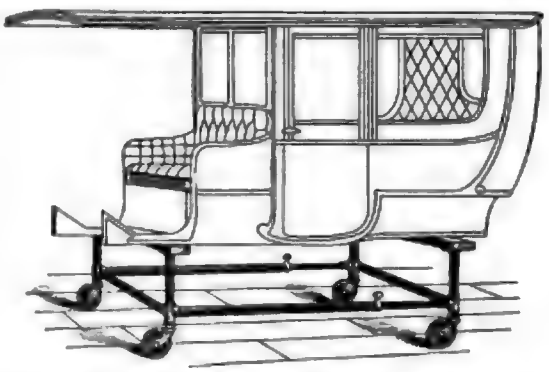
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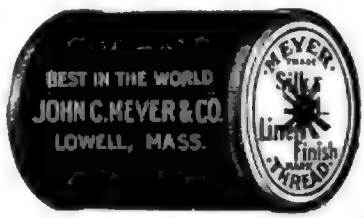


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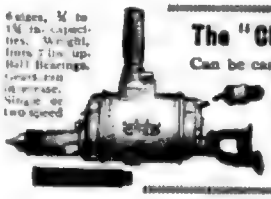


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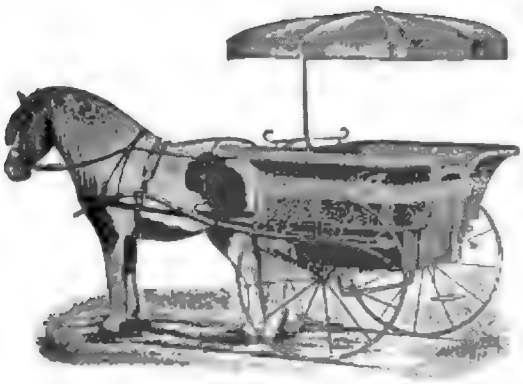
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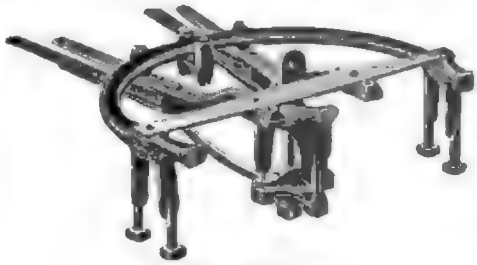
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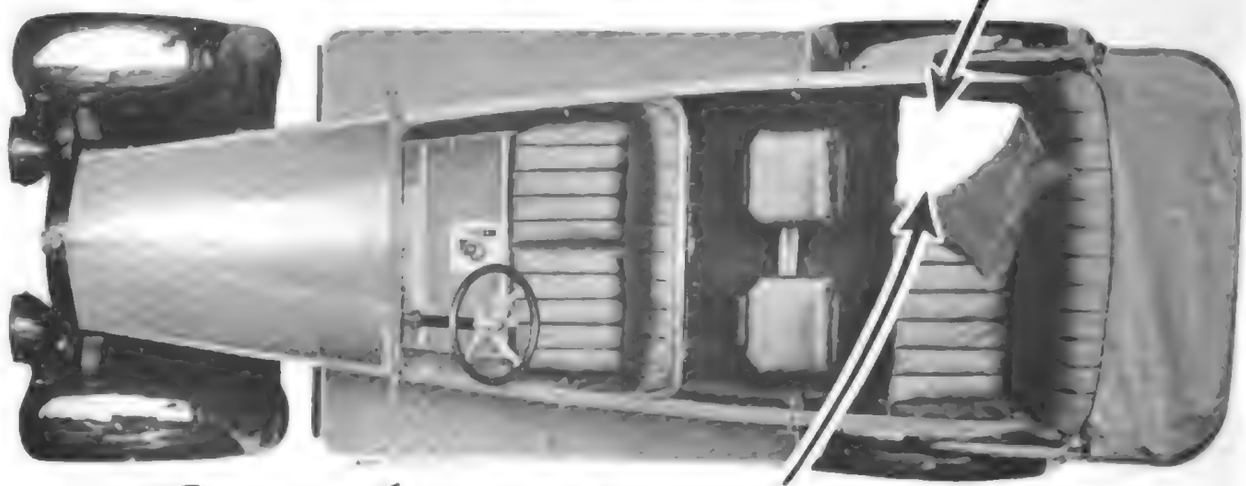
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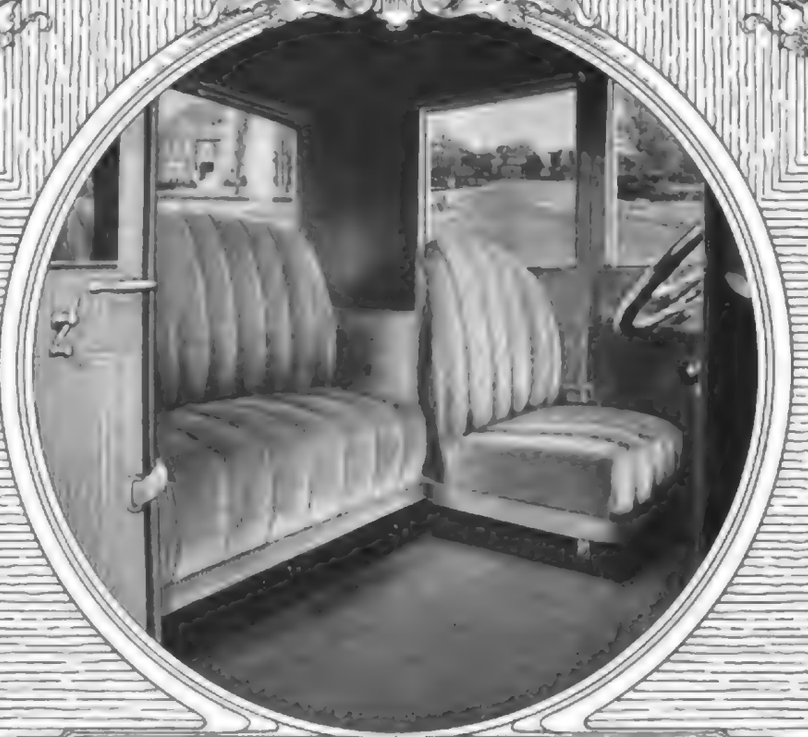
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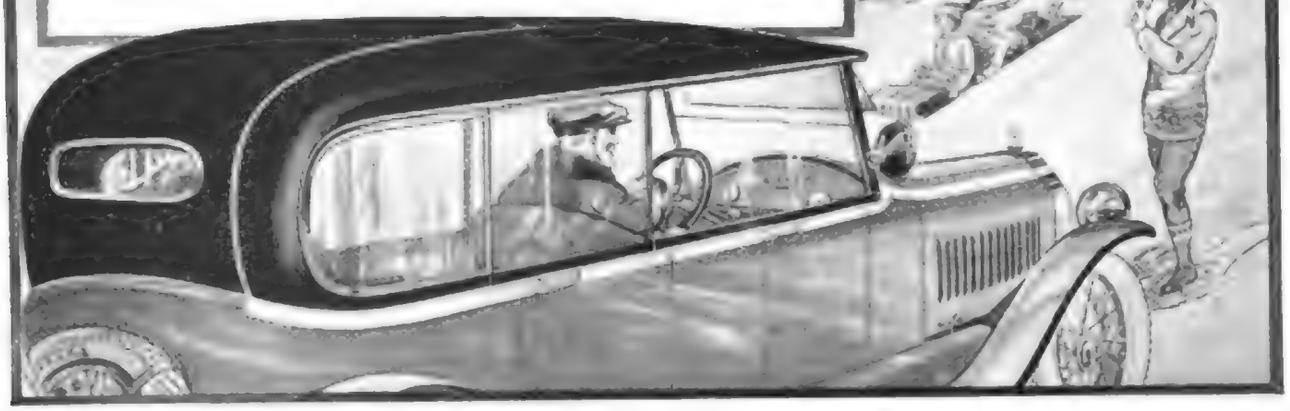
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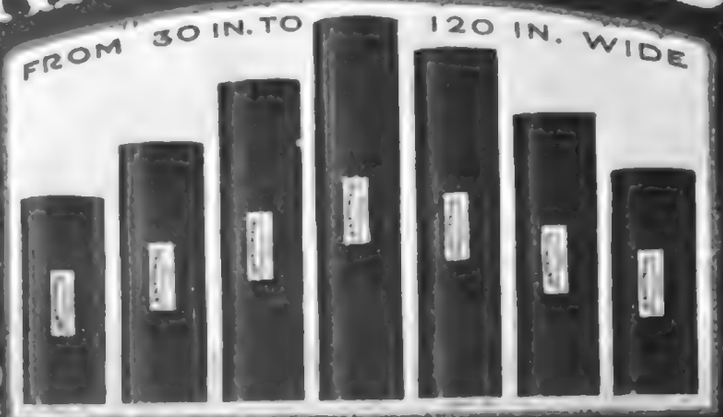
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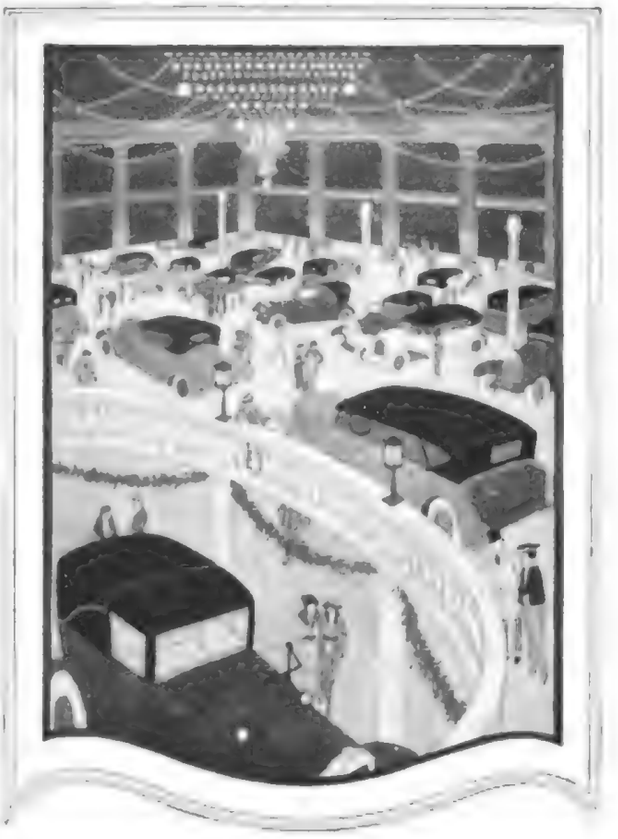
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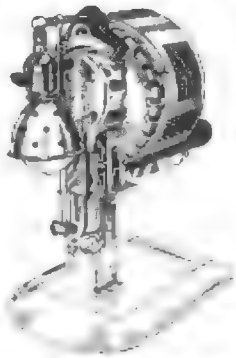
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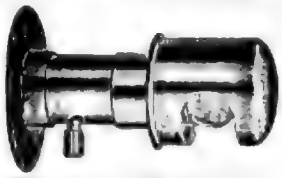
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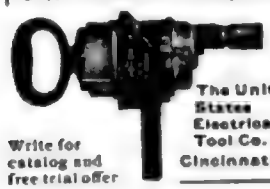
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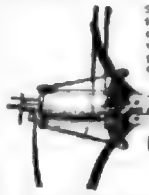
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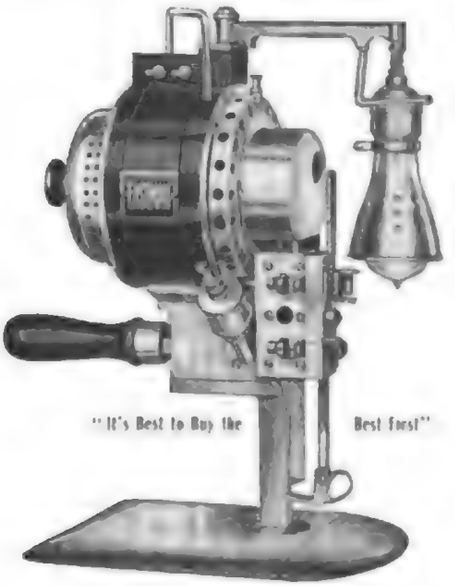
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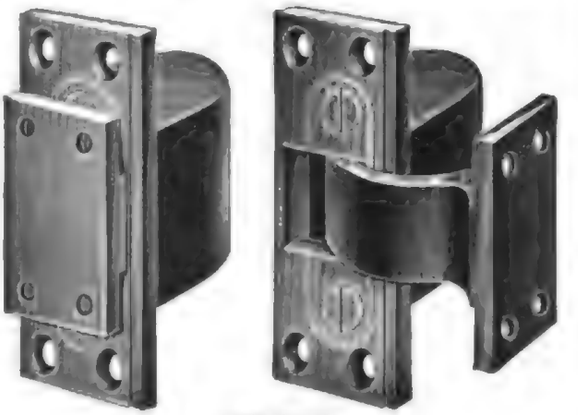
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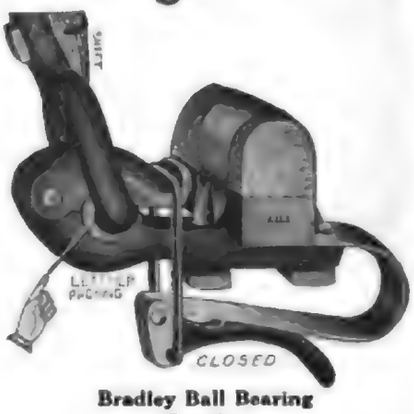
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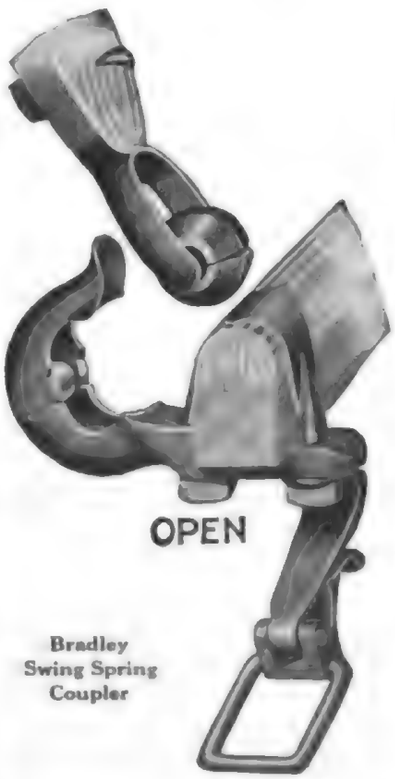
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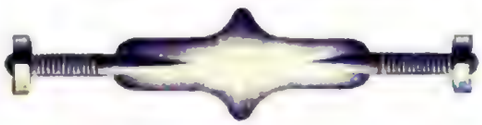
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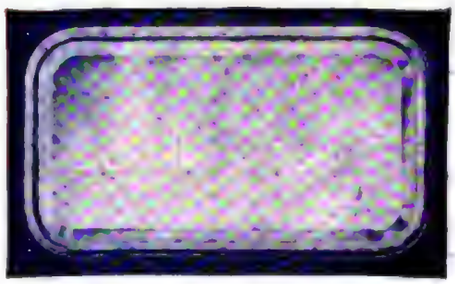


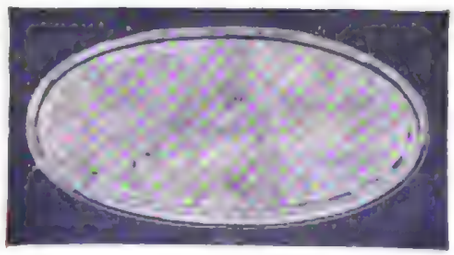
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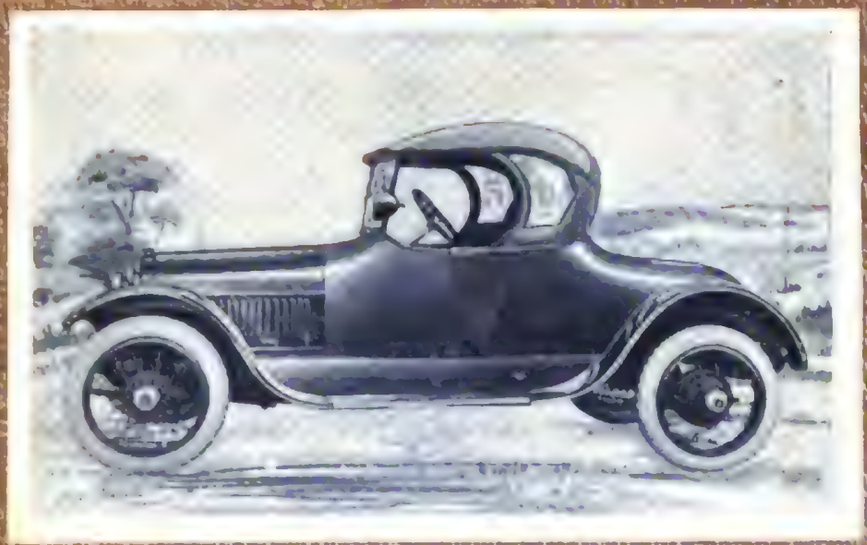
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VOL. 55—No. 12 MARCH, 1920

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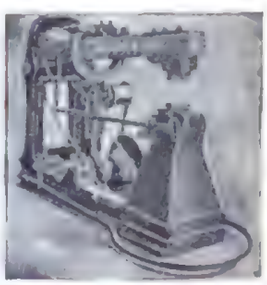
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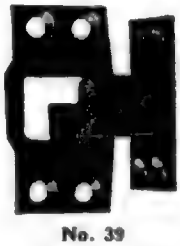
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Vol. 55, No. 12 **PHILADELPHIA, MARCH, 1920** **Subscription Price $2.00 Per Year**

Common Sense About the Motor Truck

Of all the many modern modes of transport the most fascinating today is the motor truck. In national interest—perhaps even in national possibility—it even exceeds ships and shipping. For ships do not penetrate into the heart of Ohio or Kansas or North Dakota. Motor trucks do. The hum of their engines is heard in every corner of the land; and almost every county of its hinterland as well. It is all but omnipresent. And its warmest enthusiasts only halt their prophecies as to its future because of some unfortunate limitations of the English language.

In fact, and to put the matter frankly, I should say that the greatest danger that today confronted the motor truck as a national asset was coming from those same warm friends of it. These are the men who are already talking of successful motor truck routes from New York to Chicago or from Chicago to the Twin Cities, the Missouri River or even Denver when, as a matter of actual fact, its real economies for use in continuous runs of more than a hundred miles have never proved to the satisfaction of its own builders. These men not only bring ridicule upon a form of transport which, in its own fields, is without a serious rival, to say nothing of being without a peer, but they actually form a serious stumbling block to the motor truck in its own fields of greatest opportunity.

If you were to ask me what I considered such fields, I should quickly reply by saying that I never have considered the motor truck as a serious rival of the railroad—in long-haul traffic. Under stress and emergency it has done wonders—even in the long-haul. But it seems absurd to say that it can compete with the railroad under ordinary conditions—to say nothing of the extraordinary conditions which ofttimes comes in our northern winters—for traffic moving 100 or 150 miles or upward.

The best of our modern freight trains will carry 5,000 tons—with a crew of five or six men. To move the same tonnage by motor truck would take a thousand trucks and a thousand drivers. In America, labor counts. And if you ask, how about the labor that maintains the railroad track, I will reply by asking how about the labor that maintains the highways. It is quits, or nearly so. And it would take a lot of labor upon the railroad to equalize that 994 excess of labor upon the 5,000-ton motor truck train.

Yet, on the other hand, we have in this country hundreds upon hundreds of small branch railroads, whose very upkeep is almost always an embarrassment and an extravagance to the bigger roads who own them. The motor truck can do two things with these; it can either render their operation unnecessary by paralleling their service upon the highways nearby and so permit their rails to be taken up and used elsewhere or else they can substitute flanged wheels for their tires and operate themselves upon those very rails; at a vast economy in cost and a great betterment in service rendered.

Moreover, for each of these branch railroads which I have just mentioned there are at least twenty other opportunities for the establishment of feeding lines up to the main stems or the more important branches of the standard steam railroads. It seems to me that there ought hardly to be a way-station in any producing section of the entire United States which in five years hence will not be served by at least one or more rural express routes; from five to ten or twenty or even forty or fifty miles in length. And scientific and efficient methods of operation for these should be studied out in experimental stations or schools with the least possible delay, and laid down for the benefit of individual operators.

And that is not all that should be laid down. The road to the motor truck is as vital as the track to the locomotive. Yet, with all our blusterings and propaganda, with all of our five or six million pleasure motor cars, how few really good roads we have even now in this country. Out of more than $600,000,000 appropriated by the States in 1919 for this purpose only a little over $137,000,000 was actually expended.

For this rather marked falldown there are many reasons given—the railroad congestion preventing the prompt movement of road-building machinery and supplies, the labor shortage, labor unrest and—politics. I think that the last comes nearest being the greatest trouble. Speaking broadly we have not as yet been able to eliminate even petty politics from our road-making plans long enough to work out a scientific and embracing national scheme of highway construction. Certain towns and localities are favored overmuch, and continue to be so favored. The butter is not spread even upon the bread. And little transportation progress results.

There are of course engineering details snarled in the problem, some of which are still in the progress of solution. The greatest of these involves the width of American standard highways. The most of our roads are quite too narrow for any real volume of motor traffic. They congest too readily and so raise high the factors of congestion and of actual danger. If you had ever driven a motor car after dark from New York to Philadelphia along the Lincoln Highway in the days when motor-trucking between those two cities was at its height you would appreciate the fullness of this problem.

With it is connected that of the traffic through cities and the larger towns. Not only does the local traffic of these places greatly hinder and retard the vehicle bound

(Continued on page 10)

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THE LATE RALSTON C. WARE
President of Ware Bros. Company, Publishers of "The Vehicle Monthly"

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RALSTON C. WARE

Ralston C. Ware, president of Ware Bros. Company, publishers of THE VEHICLE MONTHLY and other trade journals, was stricken with pneumonia shortly after his return from a trip to the South. The disease proved fatal and he passed from this life to the other side on Wednesday, February 4th. The funeral occurred on the following Saturday at his home in Wayne, Pa.

Ralston C. Ware was the son of the late Isaac D. and Clara R. Ware, and was born in Allowaystown, N. J., January 18, 1860. After graduating from the public schools he entered Pennington Seminary and took an academic course. As it was his father's wish that all his sons should learn a manual trade, Ralston C. Ware took up printing, and learned the art of a compositor. Equipped with this practical experience he was all the more able to give a good account of himself when, later on, he became active in the management of the publications founded by his father, one of which was "The Carriage Monthly," now THE VEHICLE MONTHLY, "The American Fertilizer" and others.

When the publishing company was incorporated in 1903, Mr. Ware became its president, which position he held until his death. In this capacity he became well acquainted with the entire personnel of the carriage, motor car and fertilizer industries. Year after year he attended the conventions of the Carriage Builders' National Association, among whose members his smiling face and hearty greeting will remain a happy memory. In the interests of his company he traveled the length and breadth of the country, meeting all the prominent men in the carriage and automobile trades in their own offices, and frequently in their homes, where business was laid aside for the pleasures of friendship.

The late Mr. Ware stood high in the publishing fraternity in Philadelphia and took a prominent part in the affairs of the Typothetæ, the employing printers' national organization. He was interested in the manufacture of chemical and pharmaceutical glassware, and was secretary of the International Glass Company, Millville, N. J.

To the editor of THE VEHICLE MONTHLY it seems fitting to add a few words of tribute to the memory of the useful and beautiful life that has passed from us.

Though Mr. Ware had reached the age of sixty, and though his career had been rich in achievement and crowned with success, yet his death has none the less impressed his friends with a sense of premature bereavement; for, on the one hand, no matter what age he reached, the time would never have come when those of us who had known his worth as a friend and counsellor could have felt ready to part with him. On the other hand, Mr. Ware was one of those whom nature, for very love of him, had endowed with perpetual youth, so that his death could never seem otherwise than premature. Even in late middle age, his mind retained the flexibility, the keen appetite for new impressions that are characteristic of the springtime of life. To this unfailing freshness of spirit he joined a sagacity and soundness of judgment which, naturally great, had been refined and strengthened by life's experiences.

Although his active participation in the affairs of the two corporations with which he was identified occupied so much of his time, Mr. Ware yet found plenty of opportunities to lead in organizing his friends and fellow townsmen in useful, uplifting and charitable enterprises.

Among his activities his church claimed a large share of his interest and solicitude. He was one of the founders of the Wayne Methodist Episcopal Church, toward whose welfare he gave and worked without stint. He was a leader in the work of a men's club, which has done much for the men and boys of his community. He was the founder of a singing society which for many years has delighted local audiences and made music a greater factor in the home life of numerous families. During the war he organized the citizens into a large chorus, with which his original singing society co-operated, stirring up patriotism and a philanthropic spirit among the people to a high degree.

Always cheery, with a smile and a pleasant word for every one he met, ready with encouragement, wise advice and substantial assistance where needed, he endeared himself not only to his fellow townsmen but also to the several hundred people who co-operated with him in the success of his industrial enterprises. Toward his employes he was companionable and friendly, on hundreds of occasions proving his deep interest in their individual, personal welfare.

No one who knew Ralston C. Ware had to be told that he was a Christian. He demonstrated his Christianity in the acts of his daily life. He drew his inspiration from a Divine Father in whom he trusted, and scattered the sunshine of a good life all along the path that he trod. He left this world better by his passing through it.

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Common Sense About the Motor Truck

(Continued from page 7)

through, but there is a certain deep-rooted and logical objection on the part of their residents to having their main streets made into through freight routes. And any large increases in motor traffic must result eventually in the planning of detour routes through or around many of these communities—to the benefit of both the communities and the through traffic operators.

These problems are commended to the attention of those who are making a study of the motor truck as a means of national transport. But before we are completely done with the motor truck I should like to touch for a final paragraph upon a phase of its possibilities which I think are quite equal to those of the rural express. This is its use in city streets in the solution of an increasingly difficult railroad and steamship terminal problem—"storedoor delivery" is the phrase most frequently used to describe it. The ramifications of this thing alone are tremendous. And so far any detailed sort of description must be left until another time.

It is sufficient here and now to say that there seems to be little excuse for express package freight bound, let us say, from the Harlem section of Greater New York to Newark or to Paterson—ten or twelve or sixteen miles distant to go in a motor truck to Jersey City, there to be loaded into a freight car or baggage car, only to be hauled for twenty or thirty minutes to a second motor truck. Obviously it would be cheaper, more direct, more effigient in every way, to send the motor truck which took the package on at the Harlem distributing station straight through to Newark or to Paterson. In all probability only the express company's contract with the railroad operated to prevent such simple haul—and so offers large room for improvement.

This problem, as I have just said, has so many ramifications, as well as such infinite possibilities that it must be studied by itself and at another time. But it is a large factor in the problem of the motor truck in America, and a large opportunity for its advancement. The day of the motor truck is certainly at hand and demands preparation for its coming.—*Edward Hungerford, in "Express Gazette."*

French Vehicle Journal Resumes

The French vehicle journal, published at 5 Passage d' Orleans, Neuilly sur Seine, Paris, France, has resumed publication after a lengthy suspension caused by the war. This journal has the title "La Carrosserie Automobile," and is published monthly. The latest number of this journal has just reached our desk and is in every way equal to the pre-war editions. A sample copy will be sent free by writing to the above address.

Fisher Body Ohio Co. has purchased a 40-acre site in Cleveland at a cost of $500,000, on which to begin the erection of a plant to contain 1,500,000 sq. ft. of floor space.

Handling Salesmen at Lower Cost

The first volume of the Shaw selling series, "Handling Salesmen at Lower Cost," has just been published by the A. W. Shaw Company of Chicago. Other volumes of the series are: "More Sales Through Advertising;" "Organizing for Increased Sales;" "Good Will, Trade Marks and Unfair Trading," and "Graphic and Statistical Sales Helps."

"Handling Salesmen at Lower Cost" contains up-to-the-minute information on many phases of sales management. Part I, "Building Up a Sales Force," suggests first of all methods of hiring—where to look for salesmen—is it best to advertise—whether to look for trained or untrained workers—what qualifications to go after——how to decide whether the applicant has the desired qualifications. There are in addition application blanks that can be adapted without difficulty to almost any business.

Other sections offer valuable tips on placing salesmen in the right territories, on wise supervision, sales reports, letters, personal contact, talks, contests, and so on.

But perhaps the most valuable material in the volume is that on selling costs, which is an outgrowth of a country-wide investigation made by the bureau of business standards of the Shaw publications. Whatever line of business a man is in, he is likely to find these cost figures illuminating. Sales managers can check up their selling costs with these cost figures and establish a basis for judging whether theirs are extravagant or economical.

If a sales manager has no adequate method of determining what it is costing him to sell, Chapter VII, "How to Figure Costs More Accurately," will tell him how other successful business men are meeting the problem and enable him to profit by their experience.

Charts and photographs reinforce the reading matter. The volume contains 186 pages and is bound in blue vellum. Net $2.50 postpaid.

Future of Automobile Sales

By E. W. Hunn, Premier Motor Corporation.

Judging from the number of fine cars sold in 1919 and the outlook for 1920, reflected in the quantities contracted for by distributors, the point of saturation in the automobile field is some years distant.

Let us analyze the situation. During 1916, 1917 and 1918, the lean years in motor car production, the number of potential buyers did not decrease when compared with former years. On the contrary, the number was greatly increased, because of the unusual amount of money in circulation due to highly paid labor, large crops at high prices and the many businesses converted to war purposes that produced large returns to their owners. The production in 1917 and 1918 was largely absorbed by the Government and the few cars left had to be spread very thinly over a demand that exceeded the supply at least eight to one in 1917 and twelve to one in 1918.

Each year a certain number of used and rebuilt cars result from one of two causes, either the owner buys another class or feels his old car has outlived its usefulness so far as he is concerned. In normal years these cars have a fixed resale value, there being a schedule on which the average dealer will market this used product. However, in 1917 and 1918 the price of cars that had seen two, three and even five years' service sold at prices better than obtained for them when new. These cars, together with the cumulative wear on all models prior to 1917, that would naturally have been scrapped, had there been a normal output, continued in use. This very wear based on six million cars now in use means that not less than twelve per cent., or 720,000 must be purchased each year to replace those used to the point of destruction. For two years of lean production we have a replacement necessity of 1,430,000 cars worn out, and another 720,000 worn out in 1916 and not replaced, or a total of 2,200,000 cars of which less than thirty per cent. were purchased in 1919.

We have in America about fifteen million prospective automobile buyers with only one-third of the number sold. This leaves ten million potential owners. Assuming that ten per cent. will buy each year, then the 1920 demand in connection with the renewal market will be conservatively 2,540,000 cars. This does not contemplate the new buyers created each year from the growing population or those who purchase more than one car.

Considered from the angle of positive demand, the stability of our national wealth, the earning power of our people, I cannot see, despite the largely increased production predicted for 1920, any possibility for saturation either in that year or for ten years to come.

American Trucks in Near East Relief

American motor trucks will be found to have played one of the most romantic as well as most efficient parts in saving the remnants of a stricken nation, when the full story of the effective work of Near East Relief, 1 Madison Avenue, New York, has been written. In saving the lives of 1,200,000 people in Western Asia, hundreds of thousands of dollars worth of supplies bought with American money, food, clothing, gasoline tractors and safety pins and everything between—are being transported, now by hundreds of motor trucks, over 500 miles of almost impassable roads to the starving and freezing people of Armenia.

Railway, auto, camel, wagon train and even man trains are utilized in the Near East Relief transportation scheme, but of these the auto truck is by far the most important. From the big supply base at Derindje on the Gulf of Ismid in the Sea of Marmora and about sixty miles from Constantinople, the food and clothing and other supplies are shipped to the interior bases and from them distributed where the need is greatest.

(Continued on page 54)

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Chassis, Parts, Metals and Accessories

The Motor Car Repair Shop

By S. T. WILLIAMS, B.S., M.E., Automotive Engineer at Philadelphia Naval Aircraft Factory

No. XIV.—FUNDAMENTALS OF PNEUMATIC CASING REPAIR

(This series of articles was begun in February, 1919.)

Pneumatic tire repair has advanced from an incidental part of the motor car repair shop to a highly specialized and important division. Whether, in any particular case, the repairs effected are a makeshift, and temporary, or are permanent and reliable, depends upon the equipment of the shop, the repair material used, and the skill of the repairmen.

It is not the purpose of the following to show the methods whereby one inexperienced or unsuccessful can become a skilled tire repairman. No one article, or book, could do that—for experience, practice and study along the right lines are necessary. The purpose is to point out the fundamentals of tire repair, and indicate the lines of study that should be followed.

In the main, the methods described are those recommended by either the Firestone Tire & Rubber Co. or the Goodyear Tire & Rubber Co. Both of these companies have made an extended study of tire repair methods and are willing to co-operate with the tire repairman in bettering his repair methods.

How a Casing Is Built Up

In Fig. 1 are shown the details of construction of a typical tire, and the various parts referred to later may be located from this sketch. It will be noted that the tire consists of a carcass built up of several layers of fabric, to which various layers of rubber are vulcanized, forming tread, sidewall and chafing strip.

The question always to be answered before starting to repair a tire is "does the balance of the tire merit the repair?" Neglecting the injury in question, the condition of the balance of the tire should be good enough to make the necessary cost of repair a worthwhile investment. For example, if a tire has been run flat, or otherwise abused, so that the layers of fabric of the tire are loose all around, even though the immediate injury is not great it is usually inadvisable to repair. Discrimination on the part of the repairman will do much to assure the success of the repairs made, and tend to build up customer confidence. To do this should be the first aim of the tire repairman.

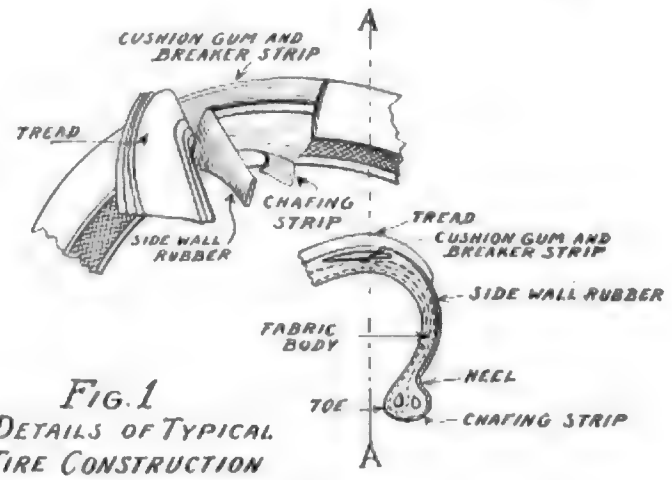


FIG. 1 DETAILS OF TYPICAL TIRE CONSTRUCTION SHOWING LOCATION OF VARIOUS PARTS.

Small Surface Cuts

Small surface or tread cuts are the most frequent injury to a pneumatic tire requiring repair. The necessity of immediate repair in the case of such cuts is obvious—for it is from these that many of the major injuries result. Motion, dirt and water quickly make the small cut a large one, and a fabric break and blowout follows.

Immediate repair of small cuts may be effected by the use of one of the several special fillers now on the market. The cut is cleaned, and the filler worked into it, vulcanizing action resulting from exposure and running heat.

However, this method of repair is not considered as certain as actually vulcanizing in new rubber, and it is this method of repair that is to be recommended. The preparation in this case comprises filing out the rubber around and to the bottom of the cut with a rasp, as shown in Fig. 2. The rubber is then cleaned with gasoline, and a coat of vulcanizing cement applied. This is allowed to dry for about an hour, and another coat applied. When this is dry, strips of tread gum are worked into the cavity, built up and trimmed flush with the surface of the tire.

The vulcanizing can be done on a small, portable vulcanizer, if the tire is left on the rim, and on a sectional vulcanizer, if available. In the latter case a sand bag may be used to apply the pressure to the inner sur-

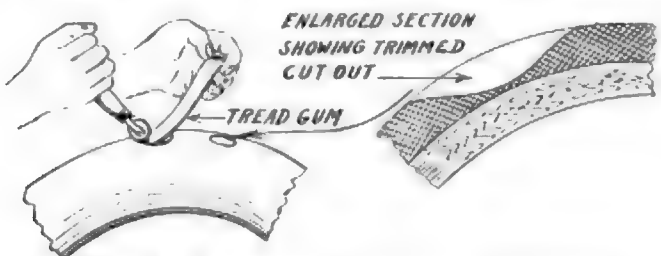


FIG. 2. METHOD OF REPAIR OF SURFACE OR TREAD CUTS.

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face of the tire. From 30 to 40 minutes at 40 pounds steam pressure should be sufficient.

Fabric Breaks

When a small cut has become enlarged to a point where more than two layers of fabric are broken, a sectional repair should be effected by either the inside or the outside method. In the case where one or two layers only are injured, the inside of the casing should be buffed and cleaned with gasoline from bead to bead, and for 3 to 4 inches each side of the break. To this cleaned area three coats of vulcanizing cement are applied and allowed to dry successively, at intervals of ½, and 4 hours respectively. A 2-ply fabric patch is then stitched down to the inside of the tire, and first covering the cemented area, and the latter reinforcing it and about 1 inch smaller all around. The cut in the tread is repaired as previously outlined for small cuts. About 50 minutes at 40 pounds is required for a repair of this kind.

Blowouts

As stated, there are two common methods of repairing blowouts—the inside method and the outside method. The preparation for the former method is shown in (A), Fig. 3, and for the latter in Fig. 3, (B). It will be noted that the inside method leaves the original tread intact, as the stepping down of the fabric plies is done from the inside. The outside method necessitates the removal of the tread from bead to bead, that the layers may be stepped down as shown. By this method all parts of the repair are under somewhat closer inspection, and the tread removed can often be saved and replaced. However, the method to be used varies with the tire repairman and the tire in question.

In effecting a repair by the inside method, the layers of the fabric should be removed from bead to bead. The number of layers to be removed depends in each case upon the size of the tire, as is indicated in the following tabulation:

Number of Plies to Be Removed—Inside Method

Size of Tire	Plies to be removed
3½ to 4 in.	Two
4½ in.	Three
5 in.	Four

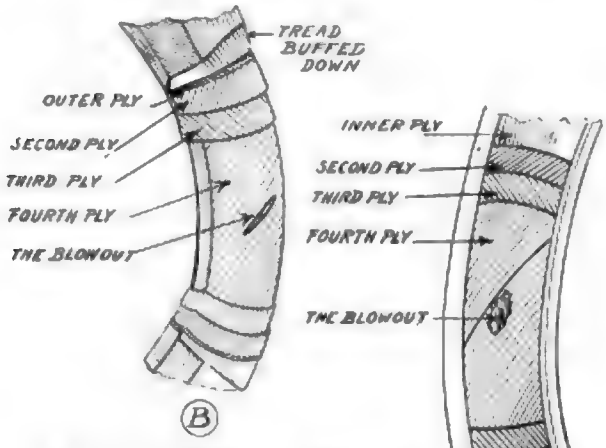


Fig. 3. (A) Method of Preparing a Blowout for Repair by the Inside Method

(B) Method of Preparing a Blowout for Repair by the Outside Method.

The plies are removed in steps as shown in Fig. 3 (A), and the fabric around the blowout beveled down to a thin edge. Two coats of vulcanizing cement are applied, the first being allowed to dry for an hour, and the second until "tacky." The blowout hole is then filled with raw gum, and the inside fabric patch stitched in place; being built up to replace the layers removed. An extra inner layer is then applied, extending about 4 inches at each end of the inner layer, and being of material having gum only on one side. The cut on the tread of the tire is filled in as described for small cuts. Vulcanizing should be done on a sectional vulcanizer, for from 30 to 50 min. at 40 pounds steam pressure.

The outside method is the reverse of the inside method, and the number of plies to be removed likewise depends upon the size of the tire.

Number of Plies to be Removed—Outside Method

Size of Tire	Plies to be removed
3 to 3½ in.	Two
4 in.	Two or three, depending on blowout
4½ to 6 in.	Three of four, depending on blowout

The layers of fabric should be removed from bead to bead, as shown in Fig. 3 (B), to avoid the possibility of a line in the tread that will work, and later break open, and the tread should be beveled down to the fabric layers for the same reason.

Two coats of vulcanizing cement are applied, allowing at least an hour for each coat to dry. The same number of plies of fabric are stitched in place as have been removed. A layer of cushion gum is then applied to the crown of the tire, and to that a breaker strip is stitched about ¼ in. narrower than the inner cushion gum strip. An outer layer of cushion gum somewhat wider than the breaker strip is then applied over the whole.

The new tread should be built up from strips of tread gum on the bench. This is better practice than building it up layer by layer on the tread, as the various layers can be better worked together, and with less danger of air pockets. These layers should be so built up that they replace the old tread removed.

Prior to the above, the inside of the tread should be buffed and cleaned with gasoline for some distance each side of the blowout. Two layers of cement are applied, and allowed to dry. To this two layers of fabric are applied as previously applied, after filling the blowout hole with tread gum.

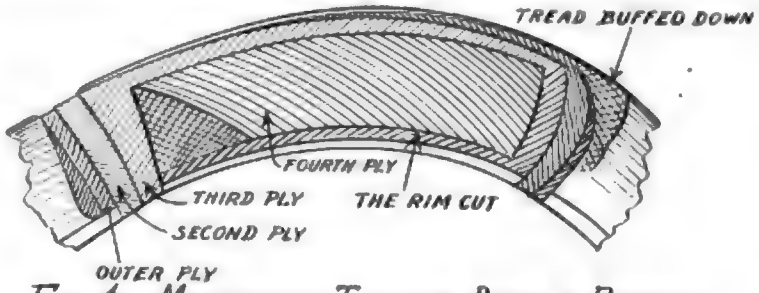


Fig. 4. Method of Tearing Down a Rimcut Preparatory to Building Up.

Rim Cuts

In general the method of repairing a rim cut follows that described for blowouts. A tire prepared for a rim cut repair is shown in Fig. 4, and it will be noted that the layers are stepped down so that they center around the rim cut. The layers replaced should extend around the rim, and up into the inner surface of the tire, far enough to secure a good hold. In the case of rim cuts it is usually sufficient to remove only

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one or two layers of fabric, though for long cuts three layers may be removed.

Retreading

Retreading is neither an easy nor a cheap operation, and in the average shop should only be undertaken after considerable vulcanizing experience and with exceptionally good tires. In retreading, the tread is removed, together with the fabric breaker strip and cushion rubber. The carcass of the tire is cleaned (not with gasoline) and brushed, after which a light and a heavy coat of cement is applied. Cushion gum and breaker strip are then applied, replacing those removed. If the new tread is to be built up, the building up should be done on the bench, in a strip, and after being stitched together, applied to the tire.

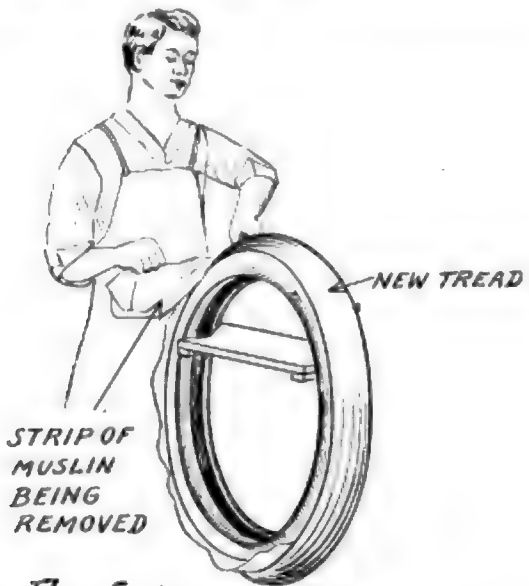


Fig. 5. Method of Applying a Retread Band to an Old Casing. The Muslin Strip is Inserted so That The Band May be Fitted in Place.

When a retread band is applied, the interior of the band should be buffed, cemented and a layer of gum rubber stitched to it. A strip of clean, dry muslin is then placed over the prepared tire, and the tread worked over it into position. The muslin strip is then removed, as shown in Fig. 5, and the union between the tread and the tire completed. The vulcanizing is done in a kettle vulcanizer.

The Goodyear Tire & Rubber Co. give the following practical hints on vulcanizing, as gained from their extended experience in manufacturing and repair work:

Vulcanizing Pointers

1. Undercuring of sectional repairs is often traceable to the molds. If these are clogged with dirt, or if air pockets form, it takes longer to obtain the required heat, and consequently longer to effect a repair.

2. Correct pressure is not always an indication of correct temperature, as water may collect in the molds and cause a temperature drop.

3. Once a month disconnect the steam pipes on the vulcanizers and blow a strong current of compressed air through them. This will keep the interiors clean.

4. Continuous use elongates air bags so that they extend beyond the ends of the sectional vulcanizer. The resulting pressure caused a ridge on the tire. This may be prevented by beveling the edges of the molds for half an inch.

5. All metal surfaces coming in contact with raw gum must be kept clean and highly polished. The polishing should be done with a fine emery paper, after which the surfaces are washed with soap and water.

6. Be sure the fabric in a tire is dry before proceeding with a repair. Moisture causes fabric separation. Drying can be done on a vulcanizer.

7. When cutting rubber, dip the knife in water.

The Dort Motor Car Co. has taken over the plant of the Lull Carriage Co. at Kalamazuo, an investment of about $500,000. One of the Lull buildings has been turned over and possession of the other will be secured on May 1. The building is to be put in shape with complete equipment of wood-working tools and machinery. The other building will be devoted entirely to the assembling, painting and finishing of closed bodies. The Kalamazoo plant will be operated as a complete unit.

Commercial Development of Aircraft

Has America forgotten the lesson learned during the war of the value of aircraft? The importance of an efficient navy to protect our shores is easily realized, and even in times of peace we cheerfully spend huge sums for its development. Yet, although most international authorities believe that in the future aircraft will form the chief means of national defense, we in this country have done very little to capitalize the knowledge gained from the expenditure of huge war appropriations to properly develop our aircraft industry.

It must be remembered that to have an efficient supply of airplanes in time of war, it is necessary to have an adequate supply of machines in peace, or else sources from which the machines and personnel can be drawn. Such a reserve can most easily be brought about by the extension of our present air mail-service to include the carrying of parcels post, and the development by the railroad and express companies of new aerial lines for the transportation of heavy parcels.

Future wars in the air will not be carried on by small machines fighting together, but by the rain of bombs from large airplanes on enemy territory. It would therefore be sound policy to seek to develop the large weight-carrying type of commercial machine, which would embody in its construction certain characteristics suitable for military aircraft. Then, should the emergency arise, there would also be a reserve of men with a knowledge of aerial navigation.

Great Britain has taken the lead in the development of commercial aeronautical transportation and is giving extensive financial and legislative encouragement to the aircraft industry.

France grants a subsidy to approved air transport lines based on the cost of depreciation. As the life of a machine is estimated at 400 hours, one-quarter of the depreciation necessary on this basis is paid by the state. This is much less than would have to be paid if the Government had to keep on hand a smaller amount of equipment.

Japan and Italy are making extensive development in their air mail service, while several of the South American Republics have made large purchases of aircraft equipment from Europe.

It is pointed out by the National Foreign Trade Council that the development of air transport and its successful use by the public will lead to improvement of communications throughout this country and abroad, and will enable business to be carried through to a successful conclusion more expeditiously.

The establishment of the necessary aids to aerial navigation, the construction of adequate flying fields near all our chief commercial centers, and the promotion of airship service to overseas countries are matters which demand the immediate attention of our Government, and which require the formation of a separate Department of Aeronautics free from the stifling influence of existing Government departments.

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"Vehicle Monthly" Time Savers

(This series of articles was begun in February, 1919.)

"Vehicle Monthly" Time Saver No. 66
LIFT FOR TUBE VULCANIZER

A convenient and quick method of suspending inner tubes being vulcanized above the vulcanizer is illustrated. The lift consists of a metal hook, carried on a cable that extends over two pulleys attached to a wall bracket, and is held up by means of a counterweight. To use, the hook is pulled down and the tube slipped over it; the weight holding the tube up and away from the vulcanizer.—Firestone Tire & Rubber Co., Akron, Ohio.

"Vehicle Monthly" Time Saver No. 67
ELECTRIC SOLDERING IRON SAFETY REST

An electric iron is a source of danger in the repair shop if left "on" in a position where it may accidentally be brought in contact with wood. The same holds true when working around a car. A safety rest may be readily constructed as shown. This rest comprises two metal brackets attached to a wooden base and holds the iron securely and away from the bench.

"Vehicle Monthly" Time Saver No. 68
FORD REAR AXLE TRUSS ROD

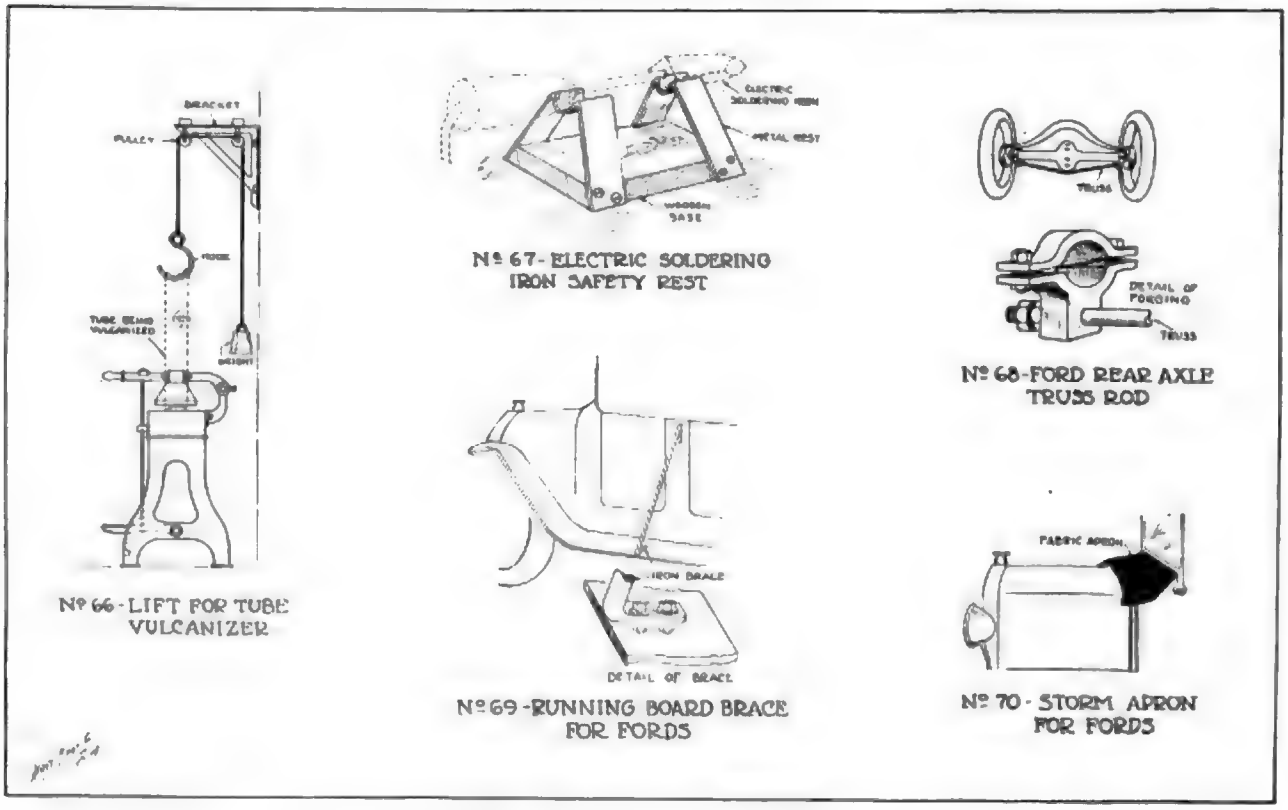
Certain repair shops consider that rear axle trouble on the Ford car can be reduced by the attachment of a truss rod, connecting the housing ends, and braced over the differential housing. The rod used is about one-half inch in diameter, threaded at each end and attached to a forged clamp bolted to the axle housing.

"Vehicle Monthly" Time Saver No. 69
RUNNING BOARD BRACE FOR FORDS

It frequently occurs that through extended use the running boards of the Ford become loose. In such cases, the running board may be strengthened by means of a steel brace connecting it to the side of the body. This brace is a steel rod, usually about ⅜ in. in diameter, flattened and bent at each end, and bolted to the running board and to body.

"Vehicle Monthly" Time Saver No. 70
STORM APRONS FOR FORDS

The terminals for the spark plug wires on Ford cars are placed on the engine side of the dash in line with the joint between the hood and the dash ledge. When running in the rain, water frequently passes through this joint, and wets the terminals. As a result, skipping may occur, and in certain instances the engine may stall. The use of a fabric storm apron overcomes this trouble. This apron is top material, attached beneath the lower edge of the windshield, and extends down over the joint between the hood and the dash.

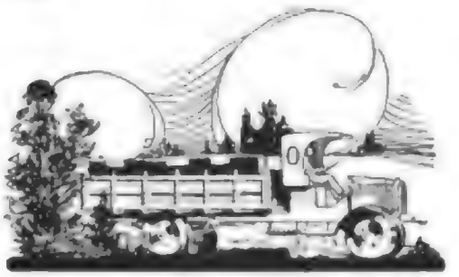


"VEHICLE MONTHLY" TIME SAVERS. SEE DESCRIPTION ABOVE.

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Rowe
THE PIONEER WORM-DRIVE TRUCK

THE BUSINESS MAN OF TODAY



isn't seeking a truck at a low figure, but one that will figure low in upkeep costs and operating expense.

If every dealer saw the abundance of evidence regarding the Rowe's economy in service, we feel sure we couldn't accommodate all who would apply for agencies.



Read further and become acquainted with the Rowe truck's construction and its salient selling features.

ROWE MOTOR COMPANY
LANCASTER, PA.

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Heart Failure

(ENGINE TROUBLE)

is Unknown to Rowe Trucks

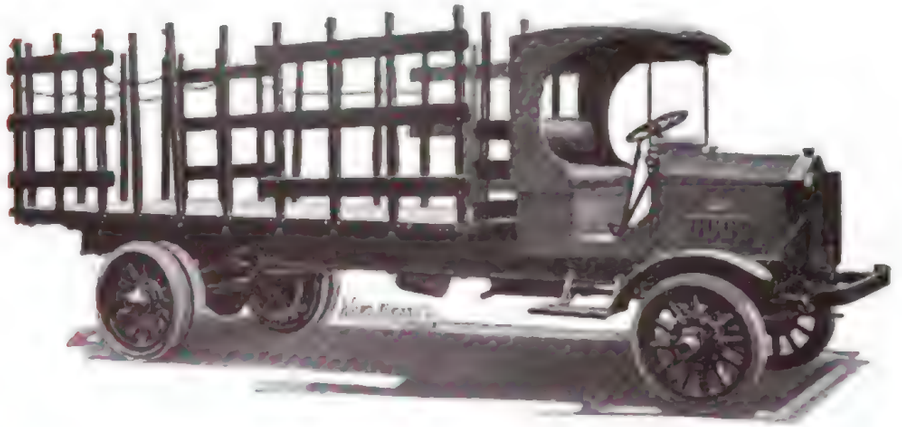
We have yet to hear of the first customer who has experienced the least bit of difficulty with the Rowe motor.

The reliability of power is a very potent factor in securing repeat orders.

Rowe trucks do not balk at bad roads and steep grades.

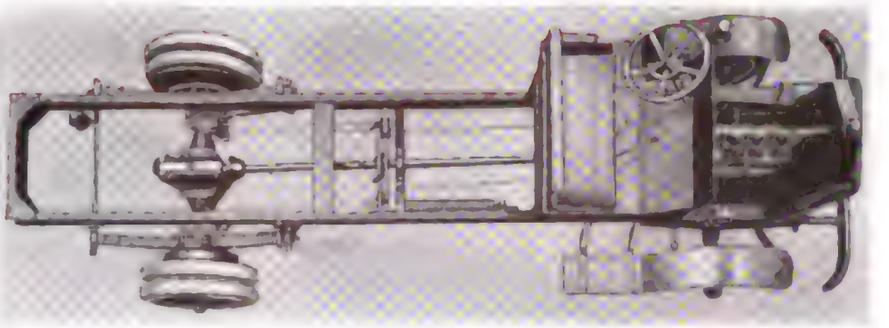
ROWE MOTOR COMPANY

LANCASTER, PENNA.



ROWE RUNS RIGHT

ROWE RUNS RIGHT



The Rowe's Accessibility Appeals to Every Prospective Truck Buyer

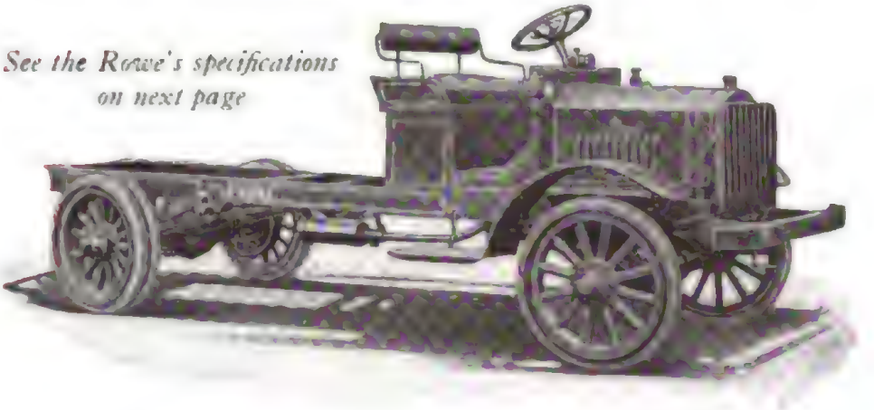
It's easy to get at any part of the Rowe's mechanism.

In case of accident, or when cleaning is required, this is an advantage that saves considerable time and money.

ROWE MOTOR COMPANY

LANCASTER, PENNA.

See the Rowe's specifications on next page



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Rowe
THE PIONEER WORM-DRIVE TRUCK

The Rowe in Detail

FEATURES THAT DOVETAIL
IT WITH DEPENDABILITY

ENGINE:—
On Pneumatic 3-Ton Model, 50 H. P. Herschell-Spillman. On other models, 4-Cylinder Wisconsin.

AXLES:—
Sheldon. Rear axle of housing type with David Brown worm gear. Worm special steel, heat treated, with hardened differential gears. Roller and ball bearings used throughout.

SPRINGS:—
Sheldon. Rear, semi-elliptic type, so slung as to minimize all road shocks.

STEERING GEAR:—
Ross. Irreversible, of the worm and nut type.

TRANSMISSION:—
Brown-Lipe. Four speeds forward and one reverse. Gears special triple heat treated.

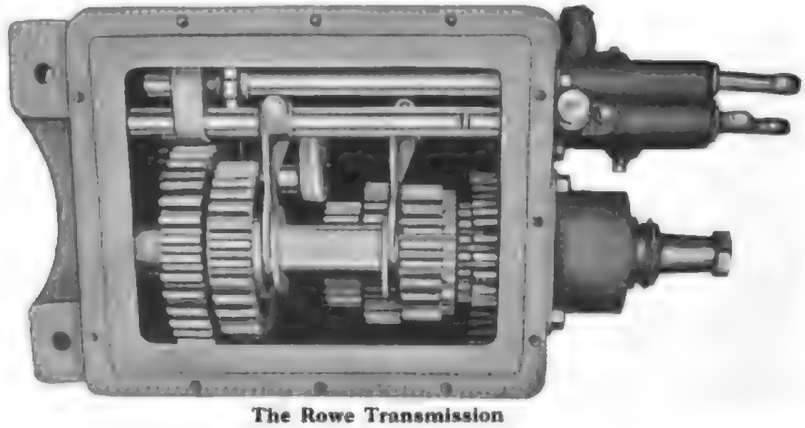
IGNITION:—
Bosch high tension magneto.

CARBURETOR:—
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The Rowe fits in with every trucking requirement. Five models:—1 to 1½, 2, 3, 4 and 5 to 6-ton capacities.

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Underground Highways for London

By Richard Spillane, in "Commerce and Finance"

Lord Ashfield's suggestion that London, in order to solve its traffic problem, must build a great system of underground thoroughfares, is likely to start a smart discussion. The traffic of London's streets is as heavy, if not heavier, than that of New York or any American city, and it gets progressively more difficult to handle. The jams are frightful. Stories are told of delays almost beyond belief.

In a speech at the American Luncheon Club Lord Ashfield said his idea was for a comprehensive system of subway boulevards exclusively for motor vehicles, these subways to connect the outer districts of the mammoth city with the heart of the metropolis and make it possible for persons in motor vehicles to get about town with expedition and dispatch. This would relieve the surface thoroughfares of a tremendous volume of vehicular traffic that now aggravates the congestion.

There are 375,000 motor vehicles in London today, and he predicted the number would increase rapidly. Not only underground motor roads would have to be built, but more underground railroads were necessary. London, he said, is the greatest riding city in the world. In 1914 the average number of journeys taken in the year per head of population was 303. He estimated the number now to have increased to 393.

Lord Ashfield is better known as Sir Albert Stanley. Like Lord Fairfax, he is American born. He is an exceptionally able man and not only an engineer of high ability but a fine administrator. He has been president of the Board of Trade of the British Government. This is a cabinet office similar to the Secretary of the U. S. Department of Commerce.

He was born in Detroit. His father was Henry Stanley, a prominent citizen of the automobile capital. Before he was knighted Sir Albert was identified prominently with the Detroit street railway system. Later he was one of the operating officials of the traction lines in New Jersey that now form part of the Public Service system.

He is a traffic student of the first grade, so what he says of London being compelled to build underground roadways for motor vehicles is sure to command wide attention.

What he says concerns not only London but New York, Philadelphia, Chicago and every great city of the world. The greatest engineering minds of the world must be centered on this problem of city traffic and find the solution, or conditions soon will become intolerable.

In New York today motor traffic moves along Fifth Avenue, the principal channel of the fashionable element, at a little better speed than three miles an hour.

It is the same in degree in nearly every city of America. The waste due to this delay is incalculable. What has been said of the delays of motor vehicles applies as well to horse-drawn vehicles and trolley cars.

Time means money in every branch of business. Few persons appreciate the money cost of delays, although all persons have to pay the bill, for it is incorporated in the price you pay for coal, for food, for everything.

If London builds underground motor roadways so will New York, Philadelphia, Boston, Chicago, Detroit—every city of size. No one will appreciate the suggestion of Lord Ashfield more than the auto manufacturer and the owner of the automobile. The automobile people have been worrying over this road question. There are 6,000,000 or more passenger cars in America today.

Alfred Reeves tells us there will be a production of 3,000,000 cars this year if the car makers can get the steel, of which there is some doubt. When you consider how the thoroughfares are crowded today, it does not seem possible for them to accommodate 3,000,000 more. But you never can tell what can be done until you try.

Underground thoroughfares for vehicles would bring many revolutionary changes. One of them would be subterranean stores. Traffic determines business. We may witness some things in this line within the next decade or two that today would seem beyond belief.

When people began to live in tall tenements and skyscraping apartment houses, and office structures began to reach into the tenth, twentieth, thirtieth, fortieth and fiftieth stories, we began to speak euphemistically of them as cliff dwellers. Now there are structures in which there are business establishments not only in cellars, but subcellars and sub-subcellars. We may go deeper when we have underground thoroughfares. What shall we call ourselves then? Moles?

Rome had its catacombs. Paris has its mysterious underground ways. Many cities have subways, but underground "highways" will be something quite new.

San Francisco National Aircraft Show

The first national aeronautic exposition to be held on the Pacific Coast will be at the Exposition Auditorium, San Francisco, April 21st to 28th, inclusive. It is one of three national expositions of commercial aircraft to be held in the United States. The aircraft and accessories shown in Chicago in January, and in New York in March, will be supplemented by other craft which could not be assembled in time for these shows. Exhibits at the New York show will be shipped to San Francisco.

The San Francisco show has the sanction, approval and patronage of the Manufacturers' Aircraft Association. Show headquarters until March 20th will be at suite 1905, 501 Fifth Avenue, New York. After that date they will be at the Hotel St. Francis, San Francisco.

A Rumor Denied

A rumor has been going around in certain sections of the trade to the effect that the Sheldon Axle & Spring Co., Wilkes-Barre, Pa., have discontinued the manufacture and sale of axles and springs for horse-drawn vehicles. This rumor is flatly denied by officials of the big spring and axle concern.

It is true, of course, that the name Sheldon is a household word in the automobile industry, and that the name stands for highest quality in automobile springs and axles; but, nevertheless, the company has not abandoned the extensive manufacture of horse vehicle axles and springs.

When the Sheldon Axle & Spring Co. decides to make no more goods for the horse vehicle trade, the industry will be advised by the company long in advance of such action. As a matter of fact, the company is turning out a great many sets of springs and axles for horse-drawn vehicles—and it certainly looks as if the demand for these goods will keep up for a long time. The horse is still a factor to be reckoned with in this country, despite the great number of motor cars in use.

"The Complete Practical Machinist"

Since the book "The Complete Practical Machinist," by Joshua Rose, M. E., first met with a kindly reception at the hands of practical men quick to recognize its sterling qualities, it has run through nineteen editions and now appears in a new twentieth edition of greatly enlarged scope, with revisions that bring it abreast of the latest and most approved practice. It is one of the best-known books on machine shop work and is written for the practical workman in the language of the workshop. It gives full practical instructions on the use of all kinds of metal-working tools, both hand and machine, and tells clearly and precisely how the work should be properly done.

To the careful and comprehensive descriptions of cutting tools and their manipulation are added several new chapters on machine tools and their attachments; some of the best of the many engravings illustrate and illuminate these chapters. Throughout the entire book the explanations are as clear-cut as the tools they describe and the earnest mechanic or machinist seeking greater efficiency will be helped toward using both his head and hands to better advantage.

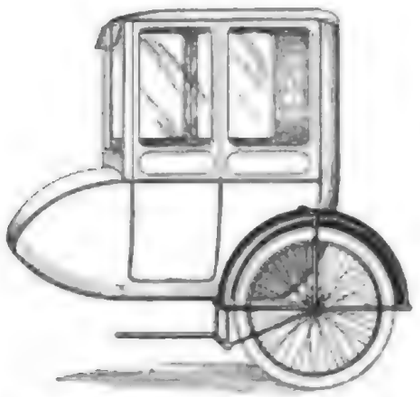
This volume is useful as a work of instruction and reference for both the machinist and apprentice and contains the knowledge that leads to the mastery of tools, satisfied ambitions and better remuneration. No metal-worker's library is complete without a copy of this useful work.

The new edition is 5¼ x 7 inches, cloth binding, and comprises 547 pages and 432 illustrations. The price is $3.00 postpaid and the book can be ordered from the publishers, Henry Carey Baird & Co., Inc., 116 Nassau Street, New York City, or through The Vehicle Monthly book department.

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English Motor Cycles and Side Cars

The products of the English motorcycle industry vary from the motor scooter, several types of which are now manufactured, up to the well-equipped vehicle constituting, to all intents and purposes, a light motor car on three wheels. The prospects of the motor scooter are doubtful, especially if, as seems likely, the principle of bulk output renders possible the production of lightweight motorcycles at just about the same price.



Side Car Cabriolet, built by Bat Motor Mfrs. Co., Ltd., Penge, England, showing possibilities for development of this type of passenger-carrying car.

For the three-wheeler there seems to be a considerable potential market. The motorcycle industry has always by its actions acknowledged this probability. At one time the "fore car" became temporarily popular and was developed into the "tricar," with wheel steering car, car control, three speeds, etc.

The "tricar" was unsatisfactory, mainly because the passenger was placed in front out of touch with the driver. Also, its arrival was practically simultaneous with that of certain very cheap small cars, of both British and foreign manufacture, against which the tricar produced in somewhat inadequate numbers could not compete successfully on the basis of price. A far cheaper combination was found to be the "side car," and this, as could be seen at the Olympia show, is now up to about the highest point that it can well reach.

The modern side car is designed to provide the passenger with just as much comfort as he could get in a full-sized motor car. In some cases provision is made for two passengers. As a rule, springs are provided between the body and the frame of the side car, and again between the frame and the wheel. Tops and wind screens are fitted, and the upholstery is high grade. Plenty of motor bicycles are built specifically for side-car work, ample power for the purpose being provided.

We seem, in fact, to be reaching the end of the period during which the side car was a detachable fitting applied to a machine usually used as a solo mount, and reaching the period in which the side-car combination is distinctly designed as such from the first. We can, of course, never get over the fact that the arrangement is one-sided and unmechanical. In the beginning it was recognized as a makeshift, and when we find the price of a side-car combination getting as high at £200 (roughly $1,000) or more, one can not help thinking that it should be possible to introduce a three-wheeled machine of sounder design giving more comfort to the driver and comparing favorably on a price basis.

The tricar has been mentioned because the type killed itself largely by developing up too far in luxury and price. Sooner or later the side car may suffer the same fate.

Returning to the motorcycle proper, an endeavor may be made to indicate the main changes noticeable in new models. The two-cylinder opposed horizontal engine is growing in popularity. V-type engines are still very numerous, and there have been improvements in single-cylinder, two-stroke engines for lightweight machines.

The most noticeable development is, however, the almost universal employment of countershaft gears, practically the only exceptions being a few machines fitted with variable gears operated by expanding pulleys.

Only a few sporting machines intended solely for speed work, and a few of the cheapest and lightest models dispense with a variable gear of one type or other, this being, of course, with a view to saving weight in the one case and cost in the other. The consequence of the tendency with regard to gears is that transmission entirely by chain is now much more usual. Most of the best machines have their chains totally inclosed.

As regards springing, practically every machine is now more or less sprung fore and aft, but as a general thing the rear portion is not wholly sprung, the springs being merely interposed in the seat pillars. Progress in suspensions is most noticeable in the increased use of leaf springs instead of coil springs.

In only a few cases are there any noticeable developments in frame design. It seems difficult to get away from the idea that the motorcycle must consist in essence of an engine and transmission attached to a pedal cycle strengthened to carry it. It must, however, be admitted that several efforts that have been made to break away from tradition have proved unsatisfactory, and thus have had a discouraging effect.

One of the novelties of the Olympia show was to be seen in the all-enclosed body of the Bat Motor Manufacturing Co., Ltd., Penge, evidencing the fact that there are possibilities in a side-car body of this description, but the model on exhibition was capable of being much improved in the proportional measurements. The door was small, and an extra 1 inch in width would have been an advantage, while the head room could have been decreased, and by extra length on the toe and body would have been much better balanced. The arrangement of heads, round corner lights with drop door handles and grey upholstery were all in well finished coach style.

The Curtiss Camp Car

That the fineness of design and workmanship required in aeronautical construction may be profitably applied to everyday uses, is suggested by the Curtiss camp car, a motor bungalow which Glenn H. Curtiss, pioneer aviator, inventor, and builder of the Curtiss JN, the NC-4 flying boat, and the world's altitude record holder, the Curtiss Wasp, has designed. It is characteristic of the inventor, when a need arises, that he instinctively fills it with a construction of his own.

The idea back of the Curtiss camp car is that of a compact hotel on wheels which the lover of outdoors can attach to his automobile and carry with him wherever he goes, as will be seen by referring to the illustration. This miniature hotel is easily hitched to an automobile and can be whisked along at a speed of fifty to sixty miles an hour without the owner being conscious of his added burden.



SEMI-TRAILER AS A HOTEL DE LUXE
Camp Car made for Glenn H. Curtiss, and designed by himself.

The "motor bungalow," as one of his friends calls it, is a compact vehicle with windows front and rear, doors on either side, strongly but lightly constructed of wood veneer. It is comfortable and weatherproof and even in inclement weather furnishes a traveling home which is bound to be the envy of even the most comfort-loving gypsy.

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It has kitchen, pantry, toilet facilities, ice-box, clothes and bedding lockers, electric lights, a running water system, table, seats, and tent cot for the chauffeur.

Its really useful characteristics, however, become apparent when it is opened for camp service. By raising the sides and inserting screen frames, the tourist can make his camp car into two complete rooms with ample sleeping facilities for two people in the fore end, and four people in the after end. The rooms are divided by curtains and there is plenty of space during inclement weather for serving meals on a table in the after compartment, the berths on both sides serving as seats, and a compact folding table playing the role of festive board. The full screen equipment gives protection from flies, mosquitoes and other insects, and a full complement of waterproof curtains is provided, which may be drawn down as a protection against rain or the cool of the evening.

The car is a veritable efficiency apartment on wheels. So effectively and completely has Mr. Curtiss worked out the details and equipment that by opening the door at the rear, all of the necessary utensils and tools, such as spade, axe, etc., for setting up camp will be found instantly available. A locker on the port side forward carries the camp stove and kitchen outfit so that no matter if it has been raining and the wood is wet, some good steaming soup and a hot cup of coffee can be made in a jiffy.

And the proof that this hotel on wheels can give service has been amply given by several trips which Mr. Curtiss and his associates have taken through the Adirondacks, Berkshires, and Catskills, amounting to over a thousand miles.

A Fifteenth-of-a-Second World

Standardized means of communication have become indispensable to human kind. The airplane, the telegraph and wireless all annihilate time and space. We have the Marconi code, the international Morse code, the national air navigation code, the railway standard time, the universal decimal notation with Arabic numerals 1234567890 which all the world understands.

But how about our weights and measures? Most of the nations have adopted a common decimal system. It is called the metric system. This nation and Great Britain lag behind. How long shall their cumbersome pints, gallons, feet, yards, ounces and tons and pounds linger in a world that is given up to scientific efficiency?

As the electrical expert, A. E. Kennelly, says: "From the moment that a wireless telegraph key is closed at one point on the earth's surface to the moment when the outgoing invisible electric wave arrives at the antipodes at the opposite side of the globe, is a little more than a fifteenth of a second Only the metric system can possibly survive on a fifteenth-of-a-second globe."

This is indeed a world-wide language of quantity available and readily understood. It is today used by all nations except the United States of America and Great Britain.

Want Proper Trailer Laws

State legislatures are taking notice of the entry of trailers as the latest factor in highway transportation and are beginning to enact laws requiring them to be registered and governing their use. Trailer manufacturers hope that by furnishing information as to types, sizes and construction of trailers and the ways in which they are used, it will be possible to aid legislators in framing legislation that will protect the highways and insure the safety of all who use them without placing unnecessary obstacles in the way of development of the most economical means of highway transportation.

Recommendations for trailer legislation prepared by the Trailer Manufacturers' Association, with headquarters in New York, have been incorporated in a uniform vehicle bill which has been drawn up after two years of work by a special committee in Washington representing the National Association of State Highway Officials, the Highway Industries Association, the National Automobile Chamber of Commerce, and the American Automobile Association. The provisions of this bill relating to registration and fees for all vehicles using the highways, size and weight, equipment and rules of the road were approved recently by national associations representing the automobile motor truck and trailer manufacturers, dealers and users.

This bill therefore represents the mature judgment of all factors most directly interested in and best informed with regard to the use of the highways as one of the vital means of meeting the transportation needs of the nation. The trailer provisions in particular are far in advance of any present laws or any bills now pending in about a dozen States where the legislatures are in session.

Now Have 48 Varieties of Laws

The use of trailers is new and limited in most States as compared with motor vehicles, and the general public and State legislatures cannot be expected to have the intimate knowledge of them required to frame laws that will stand the test of time and not have to be amended at each successive session of the legislature. To avoid repeating the experience with motor vehicle legislation, which has resulted in forty-eight varieties of laws governing the operation of vehicles that are constantly engaged in interstate travel and commerce, the trailer manufacturers are calling attention of legislators and highway authorities to provisions of the proposed uniform vehicle act and asking that bills now pending and certain provisions of existing laws be amended to conform with the provisions of the uniform bill so that the work done now will not be in vain.

It is expected that next year when practically all States will hold regular sessions of the legislators, concerted efforts will be made to have the uniform bill introduced and passed. There has been increasing and insistent demand for uniformity in motor vehicle laws and many State officials are eager to bring this about and have endorsed the draft of the proposed act.

Would Amend Laws in Three States

Steps have been taken by the Trailer Association to have amendments introduced in the New York legislature granting to trailer manufacturers and dealers the same privilege of securing blanket licenses for demonstration vehicles as are enjoyed by automobile and truck dealers and revising the gross weight limitation of motor vehicles so as to allow a greater weight on the six wheels of a truck and semi-trailer combination than on a four-wheel truck alone. Less damage is done to the highway when the load carried is distributed on more wheels and a longer wheelbase, especially as the trailer wheels do not deliver any driving effort to the road.

Action in New Jersey and Massachusetts

A similar move is contemplated in New Jersey to amend the law which now prohibits the hauling of more than one trailer or semi-trailer with a motor truck. The city of Newark and many industrial plants in Newark and other cities in the northeastern part of the State are confronted with the problem of economical removal of ashes and garbage. Cities in other States are beginning to use trailers for the purpose, sending them out singly, sometimes drawn by teams, to collect ashes and garbage and haul them to a central point. From this central point the trailers are drawn in trains of two, three or four by road tractors to dumps several miles from the center of the city. But the New Jersey law does not permit even city authorities to follow this up-to-date system and they wish to have the law changed.

Bills before the Massachusetts legislature seek to define "commercial trailers" and to fix the overall length, width and height of motor vehicles and to limit the length of a trailer train to 65 feet. The Trailer Association has urged the Department of Public Works, which had the measure introduced, to adopt the definitions in the uniform bill which distinguish between four-wheel trailers and two-wheel semi-trailers and to adopt the size limitations of the uniform bill which allows a width of 96 inches, a height of 12 feet 6 inches, a length of 30 feet for a single vehicle and a length of 85 feet for the combination of a truck or tractor and several trailers. It is also urged that the present registration fee of $10 a ton of carrying capacity, which is the same for trailers as for trucks, be made less for trailers. A trailer weighs only one-quarter to one-third as much as a truck of equal capacity, so the gross weight with load is materially less than for a truck and is carried on free-rolling wheels that do not injure the surface of the highway.

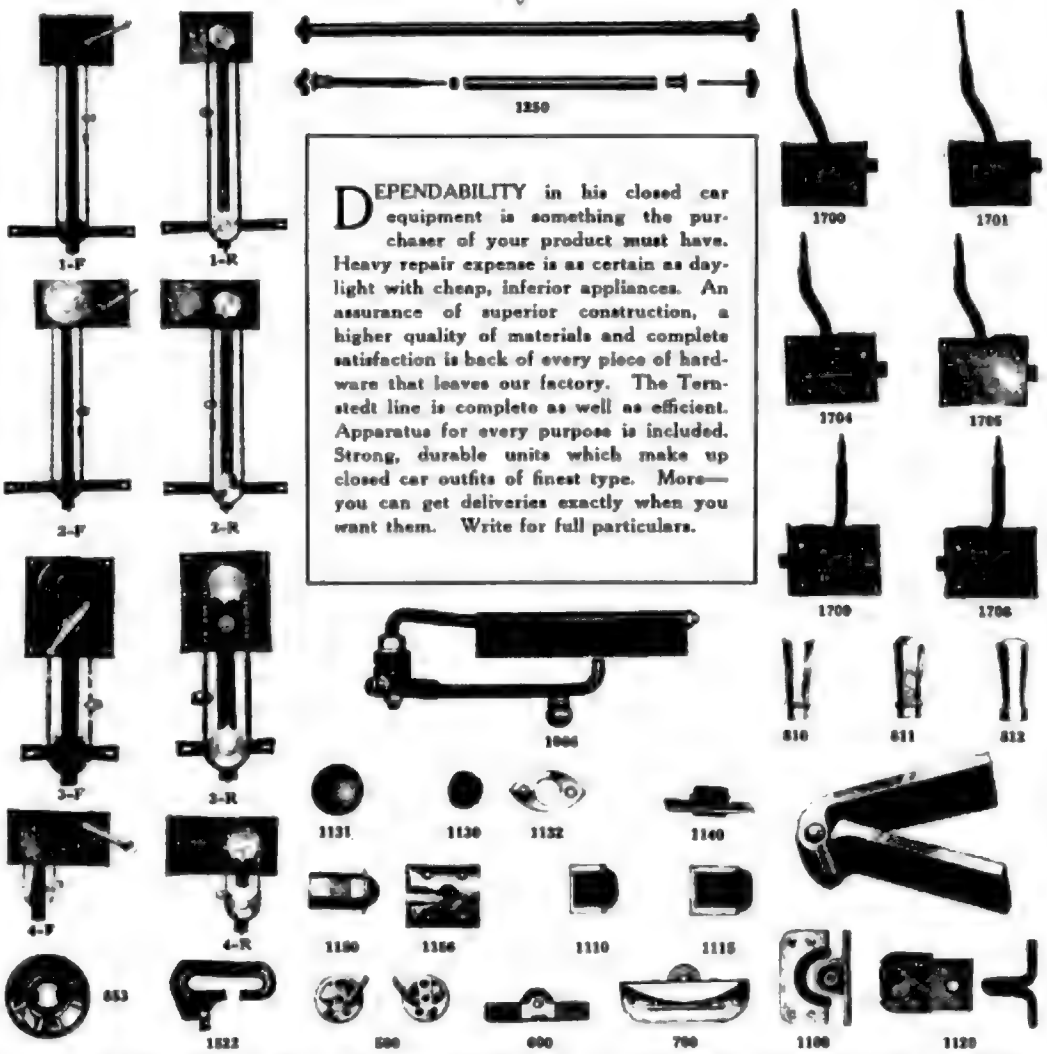
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3-F—Center Partition Window Regulator (front view)
3-R—Center Partition Window Regulator (rear view)
4-F—Rear Quarter Window Regulator (front view)
4-R—Rear Quarter Window Regulator (rear view)
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600—"Excelsior" Anti-Rattler
700—"Universal" Anti-Rattler
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811—Fluted Lever Lock Door Handle
812—Cone Lever Lock Door Handle
853—Finish Plate
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1100—Combinat'n Dove Tail & Bumper
1110—Small Rubber Bumper
1115—Large Rubber Bumper
1120—Light Dove Tail and Bumper
1130—Door Sill Plate Bumper
1131—Door Sill Plate Bumper
1132—Escutcheon Plate for No. 1130
1140—"Zenith" Roller Door Bumper
1150—"Acme" Ball Type Bumper
1156—Plate for Ball Type Bumper
1250—1920 Curtain Roller Assembly
1522—Jump-the-Fence Sash Bracket
1700—Door Lock with Safety (right)
1701—Door Lock with Safety (left)
1704—Door Lock with Safety (right)
1705—Door Lock with Safety (left)
1708—Door Lock with Safety (right)
1709—Door Lock with Safety (left)
1601—Short Door Hinge Assembly (left)
Right Mate is No. 1900

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Motor Bodies and Parts

The Principles of Automobile Body Designing

BY KINGSTON FORBES, M. E.

Assistant Body Engineer, Buick Motor Car Co., Member Society of Automotive Engineers.

(This series of articles was begun in January, 1920.)

CHAPTER V

Hoods, Hood Sills and Hood Fasteners

The automobile hood primarily forms a cover for the engine and its parts, and in order to do this it has to extend from the

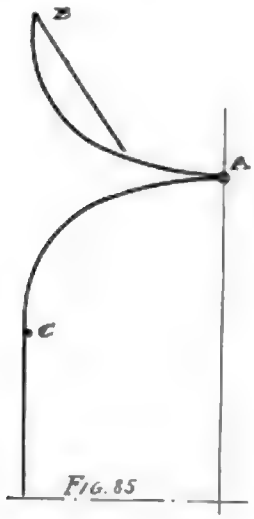


Fig. 85

radiator to the front end of the body. Suitable ledges are provided on the radiator and the body for the hood to rest upon. The hood in its simplest practical form consists of four main parts, two upper sections right and left, and two lower sections right and left. The four pieces are hinged where they attach to one another so that the hood may be easily lifted up from either side of the

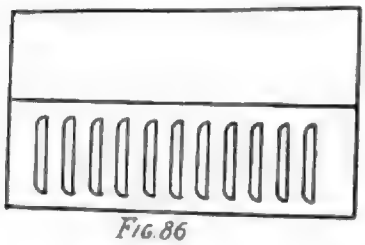


Fig. 86

car and folded up so that there is ready access to the engine. See Fig. 85, which shows the four sections with the right side lifted up and note that it is hinged at A, B and C.

It is generally necessary to provide ventilators to allow the heated air to get out readily all along the sides or at the ends or on top as the case may be. The ventilators are generally located in the lower side sections, but sometimes they are put in the upper section or a plain centerpiece is provided at the top into which ventilators are set. This makes it necessary to add a fifth section to the hood and an extra hinge. In Figs. 86 to 89 are shown four different styles of "louvres," as these ventilators are called. Fig. 86 is the prevailing type. Fig. 87 is located at the top and, while efficient, is expensive to make. Fig. 88 is located in the top section and Fig. 89 is a circular-shaped louvre on the sides.

The hood is generally made of steel, 22 or 20 USS gauge thick, but aluminum is

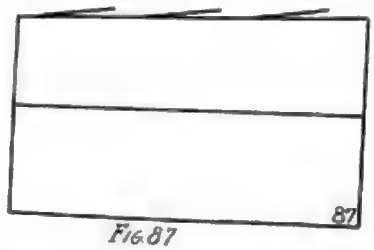


Fig. 87

used on some high-priced cars, the gain being a saving of a little weight. When aluminum is used, steel reinforcements have to be used while a sheet steel hood is satisfactory without reinforcements. In Fig. 90 is shown a scale drawing of a hood that is patterned after a very successful design. Upon examination it will be seen that the front end is lower than the back and that the front is also narrower. This is a prevailing condition, as the body designs demand this tapering effect. The top section is made in a die which forms the cone-like taper in it, and at the same time turns up the hinge section at the top and bottom. The sides are practically straight and flat; the back end of the side hinge is located ½ inch higher than the front, so that it will appear straight to the eye. If it were actually level it would appear that the back were lower than the front, owing to the hood being wider at the back than at the front. At the rear end of the hood a mead is formed to stiffen it and make a finish on the end (see section CC). The lower sections have the ends turned over and folded down flat to stiffen them (see section AA). The top hinge sections as shown in the drawing (section BB) is interesting because it is

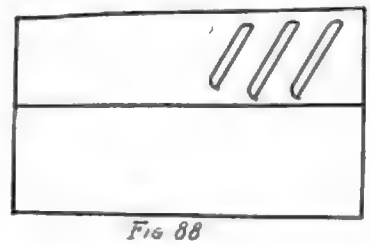


Fig. 88

formed up from the hood and provides a stiffening rib as well as a hinge. The lower hinge is formed right out of the metal too, and is a very simple construction. The top hinge uses a 2-inch joint while the lower requires a 1-inch. The small top view shows the cutouts that are necessary for the clip that secures the hood to the body and radiator.

In section DD is shown how the louvres are depressed in the hood. One-half the depression is on the outside of the hood and the other half in the inside, the object of this is to get a maximum opening without having an unsightly projection on the outside. In the sectional view shown at the rear corner a depression is illustrated, this is for a leather or rubber washer which is attached

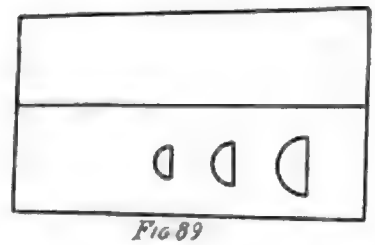


Fig. 89

to the corner of the hood to prevent the hood scratching the paint off when it is let down hurriedly and should strike on the shroud. The holes shown in the side of the hood are for the handle and hood fastener brackets.

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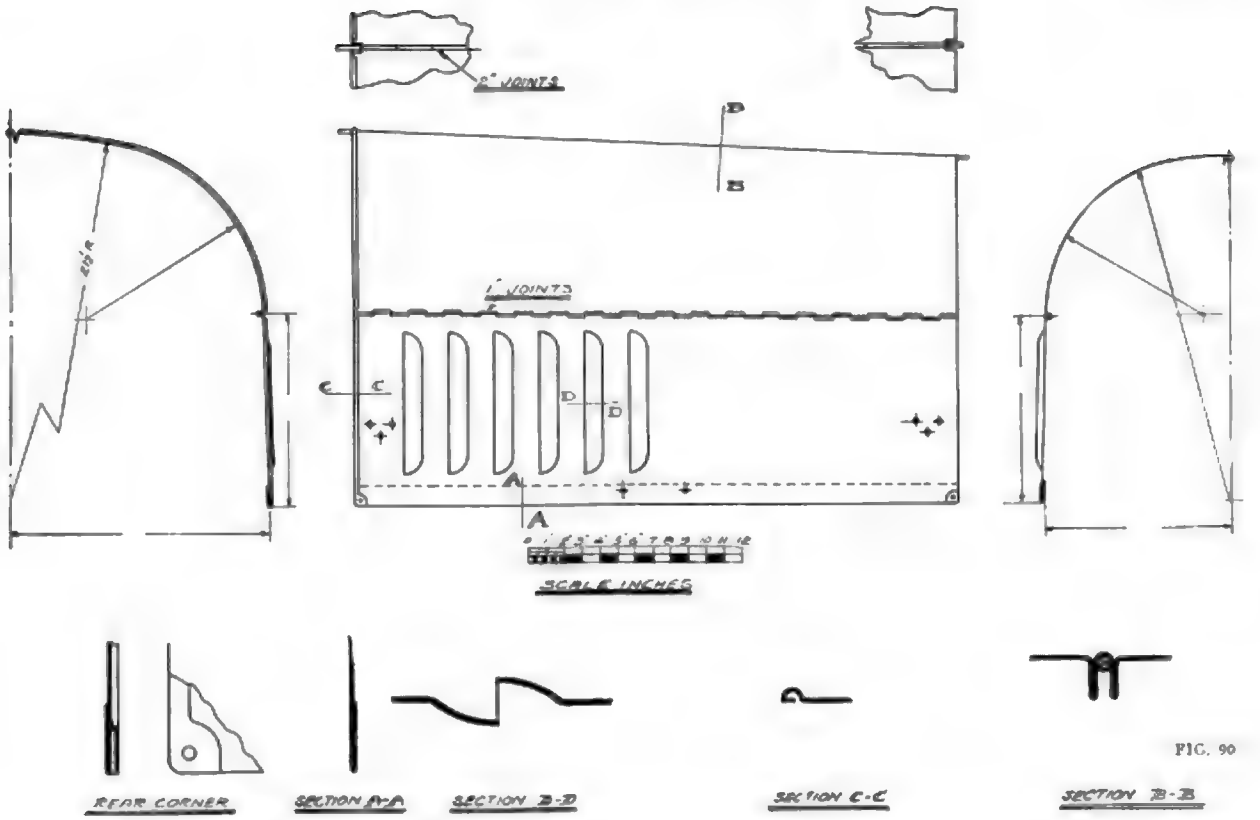
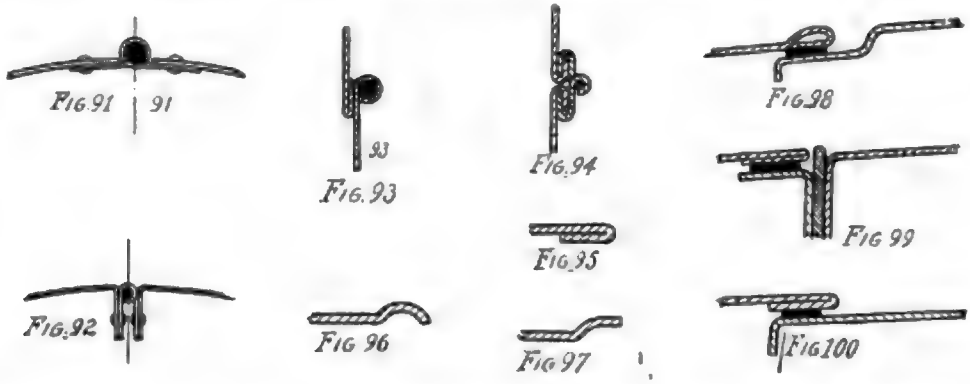


FIG. 90

In designing a hood the hinges and the cutouts must all allow the paint or enamel to be readily applied. The majority of the medium-priced car makers enamel the hoods and it is necessary to have as few projections and holes as possible so that the enamel will not collect and also make dirt runs. When the hoods are enameled all attachments, such as hood fasteners, brackets and handles, should be applied after the hood is finished, as the workmen could not enamel the hood with these parts in place. The rods used in the hinges are rust-proofed by Sheradizing or Parkerizing so they will always work freely.

While the foregoing outlines a good standard design of detail construction the various other designs will be interesting to review. Starting with the top hinge the earliest type of hood hinge was a piano type which was riveted to the two sections of the hood as shown in Fig. 91. This, it will be seen, projects above the hood line and makes an unsightly appearance, and as the car lines are desired smooth as possible this is not satisfactory.



In order to get the hinge flush a method was worked out as shown in Fig. 92. The hood section is formed down and the hinge is riveted to it; as this makes the hood stiffer a smaller rod can be used in the hinge. Very similar results are accomplished by making the hinge like that shown in the hood drawing, Fig. 93, and at the same time at a greatly reduced cost. The side hinges, constructed as shown in the drawing, Fig. 90, are of the simplest design possible, but they have two criticisms. One is that they are not water tight, and the other is that they show the notches. In Fig. 93 is shown a section of a hinge that is used a great deal, and this makes a neat appearance and is water tight. Another way of getting this result is shown in Fig. 94. A piano type hinge is used and securely locked in each section of the hood as shown.

There are several different methods of putting a head or finish on the front or rear end of the hood. In Fig. 95 the end of this metal is turned over onto itself; in Fig. 96 a molding is pressed in. With this style the edge is liable to catch on the body, so the section CC shown in the hood drawing, Fig.

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90 is better. In Fig. 97 the bead is set up so that it will not catch on the body and also to provide more clearance at the body. In connection with these moldings the method of fitting the hood has a great deal to do with the results they give, for instance there are three principal ways of fitting the hood on the body. The first, shown in Fig. 98, provides a depression in the cowl for the hood to rest on. With this style the hood finish shown in Fig. 90 is adapted. The second method, shown in Fig. 99, provides an aluminum strip or molding, against which the hood fits. With this style the hood finish shown in Fig. 95 or Fig. 96 is adaptable. The third method is to let the hood rest on top of the cowl, which does not have a depression, as shown in Fig. 100. With this method the hood finish shown in Fig. 96 or Fig. 97 can be used. It will be noted that a belt or lace is set under the hood; this is to prevent squeaking as the hood works back and forth when the car is in service.

Hood Sills

The hood sills are strips of wood or metal so formed as to fit on top of the frame underneath the hood. They run from the dashboard of the body to the bracket of the radiator, or in some cases run beyond and a short distance down the frame, where it begins to curve down to the front spring hanger. These sills are attached to the frame and make a good finish and also a convenient place to attach the hood fasteners to.

There are three general designs worth considering, the first being the one made of wood. The general shape of a hood sill of this type is shown in Fig. 101. It will be seen that at the body end the sill projects to the outside of the frame while on the radiator end the sill projects to the inside of the frame. The hood line is shown dotted in and this is what determines the shape of the hood sill to the greatest extent.

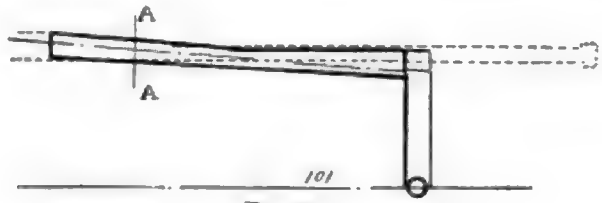
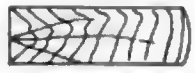


Fig 101


SECTION A-A




SECTION A-A Fig 102 SECTION B-B.

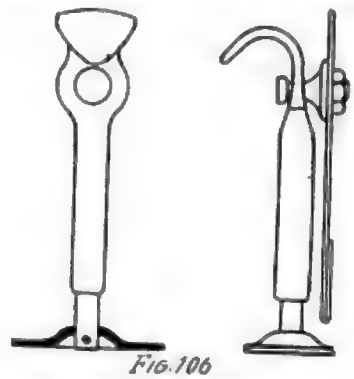



SECTION A-A. SECTION A-A WITH FASTENER BASE.
Fig 103

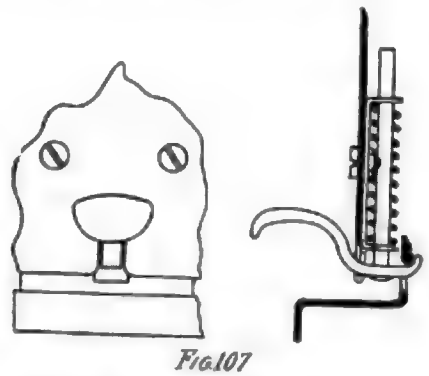
The hood sill shown in Fig. 102 is the second type and is made of steel formed up as shown in the section AA. In section BB is shown the depression made for the hood fastener. This saves the addition of a hood plate or casting on top of the sill like it is necessary in the third style shown in Fig. 103.


Fig 104


Fig 105


Fig 106

The general shapes are identical, in each case the sections alone being different. In the last case the section is just a plain angle, and obviously this is a cheap construction but does not give the finished appearance of the second type, although it is very extensively used.


Fig 107

Hood Fasteners

The hood fastener is the device used to secure the hood to the car. The hood must be held down well and so clamped that it

(Continued on page 56)

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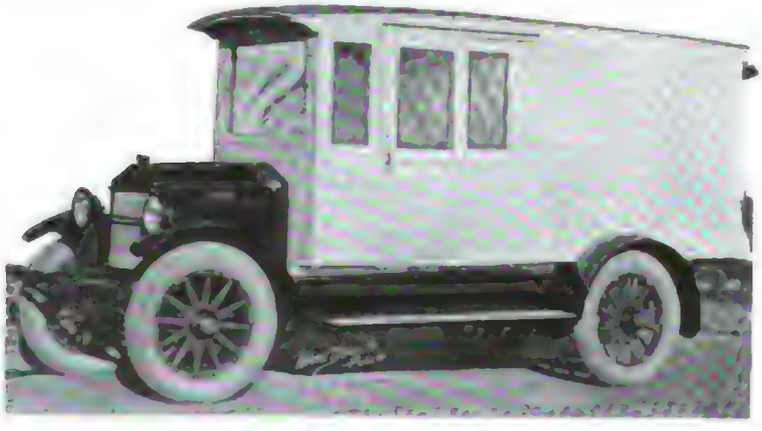
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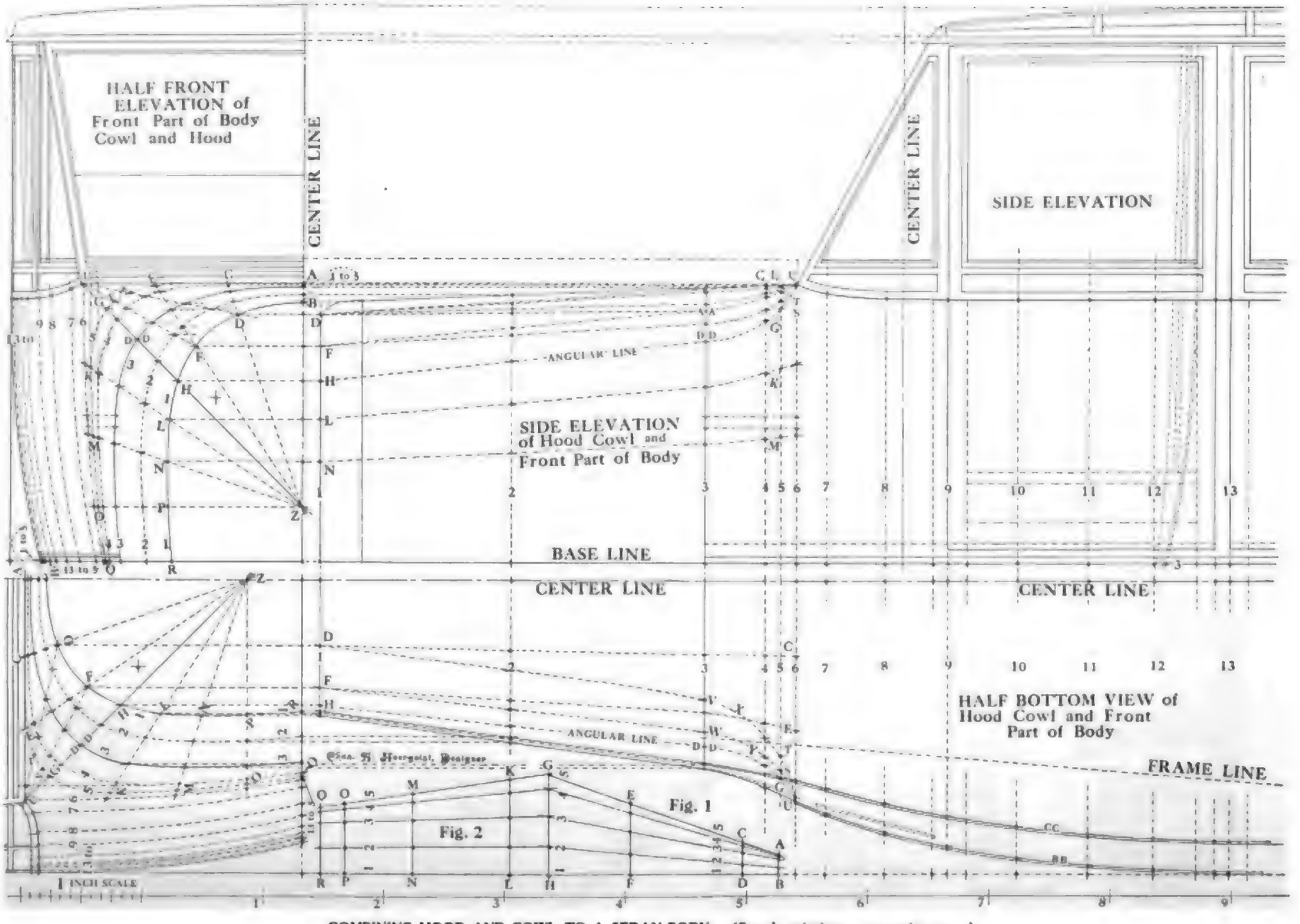
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W. T. Crane Cge. Hdwe. Co., Newark, N. J.
Gerlach & Leviam, Philadelphia, Pa
John C. Hills, Trenton, N. J.
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COMBINING HOOD AND COWL TO A SEDAN BODY. (See description on opposite page.)

Combining Hood and Cowl to a Sedan Body

(See working draft on opposite page)

In the accompanying draft we illustrate three different rules for combining hood and cowl to a sedan body, all of which terminate in the same results, and all are most practical and readily applied in automobile body building.

Explanation of the First Rule

12 and 3, half front elevation, are the three curved lines for the shape of hood; 3, 4 and 5, half front elevation, are the curved lines of the hood, and from 6 to 13, half front elevation, represent the various amounts of turn-unders for the front part of body.

Angular lines D F, T S, and point U, half front elevation, in connection with D F, T S, and point U, side elevation (same letters on half bottom view for hood and cowl) have been illustrated and explained for years on almost all our working drafts published in THE VEHICLE MONTHLY. This is one of the most simple and easiest methods applied to a working draft for any style of body designed with a hood and cowl of any shape. We have marked by points only on D F, front of hood, and T S on curved line 5 on half front elevations; also on half bottom view. The D F points are on curved line 1, and T S points on curved line 5; but there are six other points on half front elevation, connected with half bottom view, which are on curved lines. All the needed points are D F, two on curved line 2; two on curved line 3; two on curved line 4, and two, T and S, on curved line 5. We have shown the six points on half bottom view from 1 to 6, but those who are not acquainted with this rule should make the draft 3 inch scale, and square the points from half front elevation to half bottom view, and from half bottom view to half front elevation, because all points must meet as taken from one to the other.

Note points V and W on 3, half bottom view. Square this point over into half front elevation, and it will meet with line D U, intersecting with curved line 3, which is the rear end of hood and front end of cowl. Again square point W, half bottom view, over to straight line F U, half front elevation, intersecting with curved line 3, which is the rear end of hood and front end of cowl.

Square over points T S from half front elevation to vertical line 5, half bottom view, and by meeting these points curved lines X and Y are created, connecting with points V and W to point U on side curve of body.

In case there is a break in any of these lines, either half front elevation or half bottom view, the draftsman will know at once there is a mistake somewhere in points or lines, and the best way to work is by using the square from points on half front elevation to half bottom view or *vice versa*.

The rule for obtaining the points, and finally the curves, is very simple when the draftsman knows how to place them on the working draft.

Establishing the Lines for the Second Rule

In all cases the rear end of curve 3 for hood or curve 1 for front end of cowl must be taken for guides because before starting to draft the automobile body, the hood on the chassis is generally made, but if not so much the better. The body engineer can give the width and height in front and rear end of hood, including the shape of hood to suit the style of body. Some old style hoods made years ago are, to say the least, not in harmony with the outlines and size of the body; on some cars the hood has square-cornered outlines while the body is rounded on every turn, but on others the opposite is the case; therefore the hood should be designed by the body engineer in connection with the body to create a perfect combination of the two parts, and in harmony with each other.

On the second rule take the distance from point A to point U, half front elevation, and take this distance to center line from point A to point Z; draw a right angle from point U to Z. This line U Z need not be at a right angle, and can be "out" of it either way, as the result will be the same. Make the other angular lines C D, E F, K L, M N, and the horizontal line O P from point Z. Curved line 3, half front elevation, represents the shape of rear end of hood, and the front end of cowl to which the hood is fitted, and from this curved line 3, the shape of the hood toward the front end 1, and rear end of cowl 6, is decided.

For example: Take angular line G H, half front elevation, and point 5, passing through angular line G H, and carry this point over to point 5 and G H, side elevation.. If the front part of hood is desired to be more toward the square point H, side elevation, it is raised so as to be parallel with upper hood line, and if desired to be more round, point H is lowered, and can be lowered down to base line.

The shape of the cowl toward the rear depends on the desired shape of the body. On this draft with an angular sedan front the shape of cowl runs up to the sedan front to a single point U, consequently line H G is extended from point 3 to point G, and to point U, side elevation. Point G, side elevation, is squared over to point G, half front elevation, and produces the exact point on angular line G H, and running up to point U on front and side elevations.

All other points are taken the same way and the same rule is followed throughout the operation, but we will explain line E F, front elevation, to make it plain for those not acquainted with this rule. Carry point 3, passing through E F, front elevation, to point on vertical line 3, A A, side elevation, and from point 3, A A, run up the curved line to point U. These curved lines must start from points on vertical line 3 to point on U by a true curve, combining points 3 with point on U. It is the combination with points on side elevation which gives the exact points and consequently the true curves on half front elevation.

Angular lines C D, K L, and M N, are taken the same, consequently this rule applies to all the angular lines, also to D F, T S and U, half front elevation.

Half front elevation on bottom view is the exact counterpart of half front elevation on side elevation and is put in this reversed direction to suit the position of half bottom view, so that all points can be squared over same as explained for side elevation.

There is no particular difference between the first and second rule with the exception that five angular lines are substituted, instead of D F, T S and U, front elevation. D F, T S and U give only a small part of the curve on hood and cowl, while the five angular lines give three more lines to show the position of curves on five angular lines, which is a great advantage to designers and body builders.

The rest of the turn-under lines, from 6 to 13, correspond exactly with side elevation of upper part of body, B B, and lower bottom edge of sill, C C. All the points on side curve of body, B B, and lower bottom edge of sill are squared over to half front elevation same as all other points on all the angular lines.

The hood on top is straight on side elevation; but suppose the hood is straight and level front and rear; points A B then, on center line for half front elevation, would converge to one single point. In other words, curved lines 1, 2, 3, 4 and 5 would end on point A and center line, half front elevation; and R Q, half front elevation, depends always on the construction of hood and cowl.

Explanation of the Third Rule

The laying out of the curved lines on half front elevation and side elevation of hood and cowl are the same, so are the five angular lines on the half front elevation; in fact the results are the same as in the first and second rules. As in the two other rules, curved line 3, the rear end of hood and front end of cowl, is the most important curve, which must be exactly as the original layout; all the rest follow that curve. By establishing point H, side elevation, passing through the right angular line H G, half front elevation, this point gives part of the curve on front edge of hood. Suppose we raise point H, it will change the curve.

On this draft the front edge of hood has a trifling turn-under and the widest part of it is on L, N; on other drafts the widest part of hood is on bottom edge, consequently the points and lines must be established to suit the desired shape of rear and front hood line.

On the third rule we need curved line 1, front end of hood; curved line 3, rear end of hood or front end of cowl, and curved line 5, all on half front elevation, and these three curved lines are established same as explained on first and second rule.

If the hood is already made and not suitable for the continued curve of the latest style of bodies, curved lines 1 and 2 are dis-

(Continued on page 56)

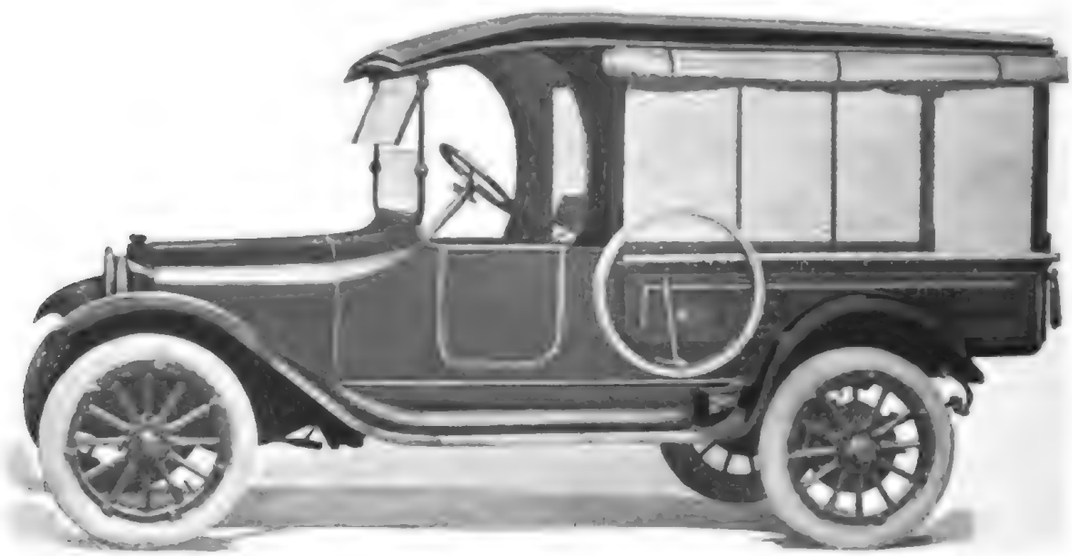
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Working Draft of a Six-Passenger Body

Fitted to a Dodge Bros. Commercial Chassis

The Dodge commercial chassis has been specially built for commercial uses, but is exceedingly well adapted for hearses, and passenger automobile bodies. With this explanation we will describe the manner of fitting the various styles to the frame and give the dimensions needed for body builders' use.

The length of wheelbase is 113½ inches; the diameter of wheels is 33 inches; the diameter of pneumatic tires is 4 inches; width across the tires, center to center, is 56 inches, front and rear. The height of frame from top of frame to floor is 24 inches, and rear of axle 26½ inches, being raised 2½ inches above the main top line of frame. The width across front of frame is 23 inches, out to out, and 38 inches across rear end. For shape see top view of frame, below side elevation.



Commercial Body on a Dodge Chassis, which is suitable also for certain styles of passenger bodies.

Fitting the Body to the Frame

One of the most important points to know in body builders' practice is that the Dodge chassis has two different shrouds, or cowls. They are exactly alike except in length; the shortest one is 12½ inches and is flush with rear surface of the windshield. In other words, the rear end of shroud is on a vertical line with rear surface of the permanent windshield. The other kind of shroud is 3¼ inches longer. The short shroud is used for hearses and passenger cars and the longer one is used for commercial bodies, but the latter shroud could also be used for touring bodies without a closed top, and the rear end of shroud would form the front door joint.

Note the side elevation of frame. On a commercial body the shroud is 15¾ inches long from hood joint; or 3¼ inches from inside surface of windshield, and is indicated on draft by a dotted line, representing the front door joint on side elevation of frame. The rear door joint is also shown, indicating also the width of the commercial body door, which is 19 inches. At the front door joint a pillar is fitted against the shroud, to which the door hinges or door locks are fitted. Note the circular tank, which is 30½ inches long and drops beneath the top of frame 2¼ inches. The seat is above the tank, about 12 inches from top of frame. The shroud up to front door joint, including the pillar on which the door hinges or locks are fitted, also the stationary windshield, belong to the finished chassis, also the footboards; consequently when a body is fitted to the frame it starts from the front door joint, but the sills and bottom boards start from the footboard.

When a commercial body is fitted to this frame and ordered to be suspended as low as possible, a raiser is fitted between the footboard and the frame curve in the rear, which must be 2½ inches deep to be level with rear part of frame; on this raiser the body is bolted, through raiser and frame.

The body space from rear surface of windshield to rear end of frame is 77¾ inches. Suppose we want to use an 8 foot long body, starting from rear surface of windshield; there would be 18¼ inches overhang, from rear end of frame. If the commercial body is not bolted to the frame through the sills, and as the six holes are ready made in the frame, the bottom cross bars must be placed so as to meet the holes. The position of these holes is shown on top view of frame together with the dimensions, as on the blue prints.

If the body is to be fitted between the fenders, which inside space is 47 inches, the width of body outside should not exceed 46 inches. If a wide body is to be used, the space between the tire flanges is 51 inches, and the recess across should not be more than 49 inches, which is shown on top view of frame.

On a wide body the radius of fenders must be considered which is 19⅜ inches, and highest point from top frame to top of fender is 14⅛ inches. The body space from rear of windshield to center of rear wheel, from which the radius of fender is started, is 77¾ inches.

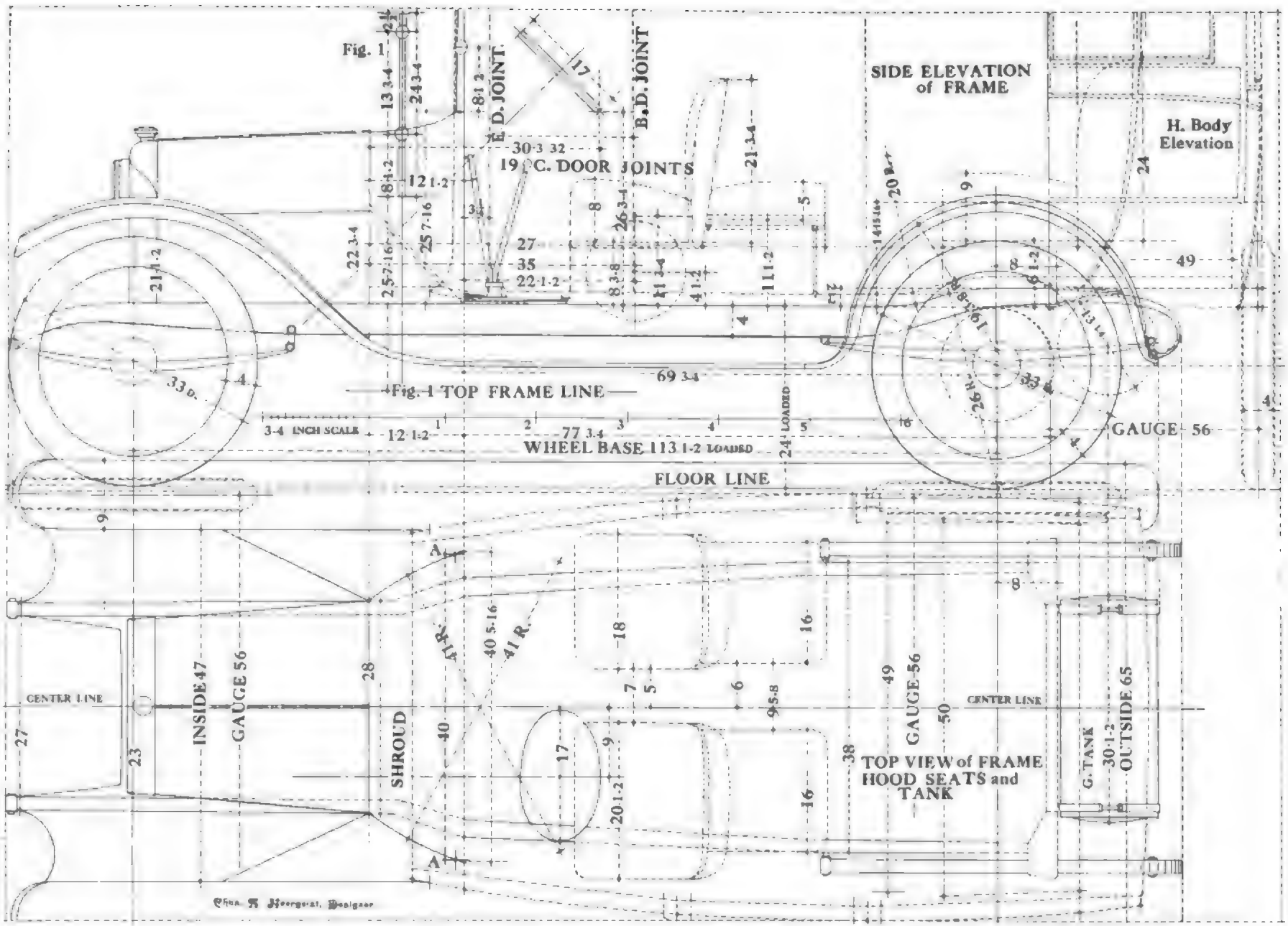
This radius of 19⅜ inches is very important because the fender must not only fit in the wheel recess, but must also have the right length from front to rear centers of wheels, as the body must lap over the fenders.

Fitting a Hearse Body to the Dodge Chassis

At the recent Philadelphia truck exhibition there were two hearse bodies fitted to the Dodge chassis, on which the front of the hearse body was fitted against the rear surface of windshield, and the 12½ inch shroud was used, leaving a joint on rear end of shroud, which is objectionable, unless a small molding is fitted around the shroud to cover it. On those hearses the stationary windshields were removed, and others of a different make were fitted to the body. This was due to the height of the windshield, which is 50 inches from top of frame to top of windshield, while on the hearse body this space is not over 42 inches.

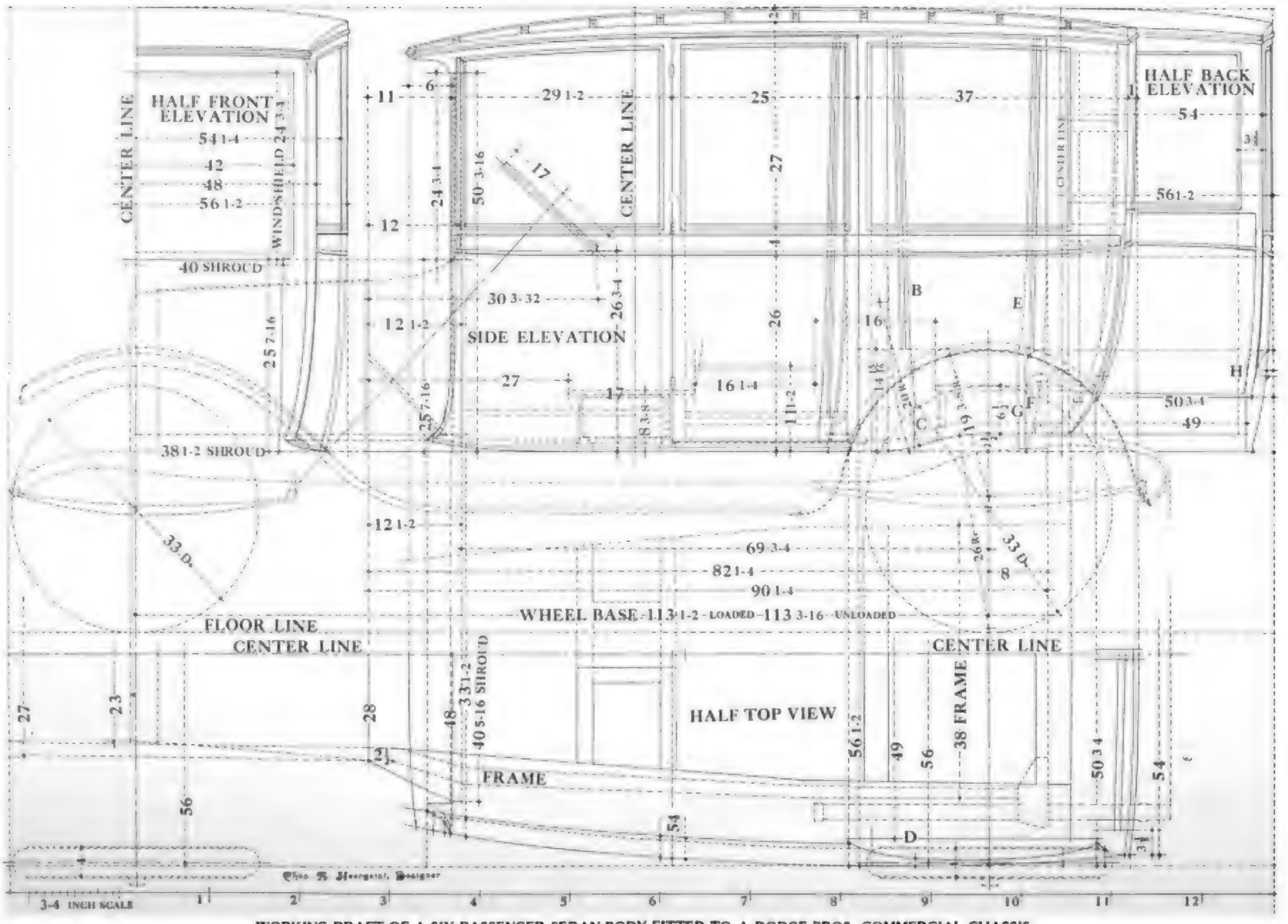
If an 8 foot long hearse body, without the front cab, is fitted on this frame, it must start from the rear of tank. This space from rear of tank to rear end of frame is 48 inches, which would create an overhang of 48 inches for an 8 foot long body. If the tank is removed and fitted to rear end and the casket shifted under the seat, the space from

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SIDE ELEVATION AND BOTTOM VIEW OF DODGE BROS. COMMERCIAL CHASSIS SHOWING ADAPTABILITY TO A PASSENGER BODY

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WORKING DRAFT OF A SIX-PASSENGER SEDAN BODY FITTED TO A DODGE BROS. COMMERCIAL CHASSIS

front of seat to rear end of frame would be 5 feet 4 inches, and an overhang of 2 feet 8 inches. There is one remedy for the excessive overhang—the chassis can be lengthened, which is generally done.

If a touring car body is fitted to the chassis the long or commercial shroud is used and the rear end of shroud is used for the front door joint.

Fitting a Six-Passenger Sedan Body to the Dodge Commercial Chassis

The Dodge chassis is especially well designed for a six passenger sedan body and they have been used in cab service, to carry passengers from railroad stations and for hotel service, same as the Ford sedan has been used for years. The advantage is with the Dodge cars, as they carry six passengers, and on account of the width across the rear of body, 56½ inches, three passengers can be seated if necessity requires it. The guaranteed carrying capacity is 1,000 pounds, and the body can be built very light, because there is only one door on each side and the frame is 4 inches deep, which will carry the weight easily without any settling of the frame and body.

Note the position of seats on side elevation of sedan body. The space from front joint of shroud to front edge of seat is 27 inches; the depth of front seats at bottom edge is 17 inches; the two auxiliary shifting seats are 16¼ inches; the space between the auxiliary seats and rear seat is 16 inches, and the rear seat is 17½ inches deep, with plenty of space for a full spring back.

Both the auxiliary seats are made to shift and are placed under the front seats. In case baggage is carried by the passengers, one of the two auxiliary seats is folded. It can be replaced in a few seconds when required. The two front seats are also made to move toward the front for the convenience of the driver and passenger.

For position of seats see top view of frame, hood, seats and tank. The driver's seat is 20½ inches across and is moved toward the center line on account of the position of the steering wheel, consequently the cross width can be increased.

The front passenger seat is 18 inches across and the space between the driver's seat and passenger's seat is 7 inches. On account of the front seats being moved toward the right side of body, the auxiliary seats are moved in the same direction in proportion; this adds to the space for entering the body from the left side. These two auxiliary seats are 16 inches across and the space between is 9¼ inches. The rear seat is fitted between the wheelhouse, which is about 49 inches across on seat and 50 inches across the cushion.

The bottom cross bars for the two shifting front seats must be put in the right position, and are shown on half top view on working draft of sedan body.

Details of Construction and Dimensions of a Six-Passenger Sedan Body

The length of body is divided as follows: From hood and shroud joint to front of coupé pillar, 11 inches; length of hood on extension, 6 inches. Length from front surface of coupé pillar to front door joint, 29½ inches; width of door, 25 inches. From rear door joint to rear back corner pillar, 36 inches and 1 inch curve across.

The height of body from bottom surface of belt rail molding is 26 inches; from lower edge to belt rail molding to fence rail, 4 inches; from fence rail to upper edge of top rail, 27 inches, and 2 inches curve across, making 59 inches in all.

The widths across are as follows: Across front edge of coupé pillar, above fence rail, 48 inches; across front door joint 54¼ inches; across rear door joint 56½ inches; across rear back corner pillar on top, 54 inches; and on lower edge of wheelhouse, 50¼ inches. All the above dimensions are shown on the working draft.

The length of the frame to which this body is fitted is, from hood joint to center of rear axle, 82¼ inches. From short rear shroud end to center of rear axle, 69¾ inches, and from hood joint to rear end of frame, 90¼ inches. The radius of 19⅜ inches starts from center of rear axle, 14⅛ inches above top of frame.

The length from center of axle to rear end of frame is 8 inches. The above dimensions are shown on half top view and side elevation on working draft of sedan body.

The tank which is shown on side elevation of frame below the front seat must be moved to rear end between the rear springs back of frame, shown best on top view of frame.

The front width of body on this draft is determined by the width of the windshield, because the windshield is permanently fixed to the chassis and used in the same manner as on the commercial body; consequently the width across the windshield must be known, as also the width or widths across the shroud, top and bottom; same applies also to the height from top of frame. On the Dodge Brothers' blue print this width is about 42 inches, out to out, but the safe way before the working draft is made is to measure this width across, and the space between the coupé piller and outside of windshield frame should not be more than ⅛ inch.

The height of this windshield, according to the blue print, is shown on Fig. 1 on side elevation of frame and also on side elevation of sedan body. The height from top of frame to top rear end of shroud is 25⅞ inches. From top of shroud to center of lower windshield joint, 8½ inches. Space between the lower and upper joint, 13¾ inches. Between center of upper joint and top of windshield, 2½ inches. Combined height from top of shroud to top of windshield, 24¾ inches. Combined height from top of frame to top of windshield, 50⅞ inches.

If on a sedan working draft the commercial shroud is used, 3¼ inches must be cut from it, or, it should not be over 12½ inches long. The Dodge Brothers make one to fit, that is, the commercial shroud is cut to the required length used on hearses and can be ordered with the chassis. The shroud on outside surface has a radius of 41 inches, as shown on top view of frame, and laps back of the coupé pillar about 1¾ inches.

On the blue print this width is 40⅞ inches, but the coupé pillar can be moved 1⅝ inches forward, as shown by two points A A on top view of frame. From points A A the shroud has to be bent inward, otherwise the body when mounted could not enter between the two coupé pillars; but we will make the width across about 40 inches instead of 40⅞ inches as shown on A A, top view of frame. As this shroud must fit tight and is screwed against the coupé pillars the body maker or draftsman must take the widths across the top and bottom of the shroud correctly. There is a trifle of curve from top to bottom edge which should be reproduced exactly on the coupé pillars.

By doing this as above explained the windshield is recessed into the coupé pillars 1⅛ inches and rear surface of windshield frame rests against the recessed rabbet to keep out the draught. The upper cross bar is not recessed as the upper part of windshield must move backward and forward, but it should be fitted as closely as possible.

If made as above explained the job will show very satisfactory workmanship, and will be pleasing to the client who orders the body built on the Dodge commercial chassis.

Moving the Gasoline Tank

On a sedan body where the gasoline tank, 30½ inches long, is placed under the front seat and between and across the frame, the seats as designed on top view of frame can not be placed as shown, as there must be a space from 5 to 7 inches to enter between the seats, consequently the tank has to be removed, and the rear end is the most available place. On the Ford sedan the tank is under the driver's seat, specially made to fit in the space, but this cannot be done because the auxiliary seats are placed under the two seats, and the space is also needed for baggage. The tank is shown on side elevation of frame and also on top view of frame and should be placed as near as possible toward the rear axle.

Details of Construction of Six-Passenger Sedan Body

Note carefully the dimensions from rear end of shroud to center of axle, which is 77¾ inches. Also the 19⅜ inches radius, starting 14⅛ inches above top of frame on center of wheel.

On this working draft the thickness of sills is 1¼ inches, but can be made 1½ inches, as they are 9½ inches wide, from front coupé pillar to rear door joint and will be sufficiently strong when bolted to the frame. The size of coupé pillars on side elevation are calculated as follows: ¼ inch thickness of molding on front surface of pillars; 1⅛ inches for recess of windshield.

The windshield frame, according to the blue print, is 1 inch thick and this frame should be recessed from outside of coupé pillar, on inside surface, ⅛ inch. The rear part of coupé pillar on which the windshield

(Continued on page 50)

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The Vehicle Monthly Course in Drafting and Construction

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Part E—Lesson 35. Working Draft of a Runabout Body

(Continued from pages 51 and 52, February, 1920, of "The Vehicle Monthly.") (For description see page 35.)

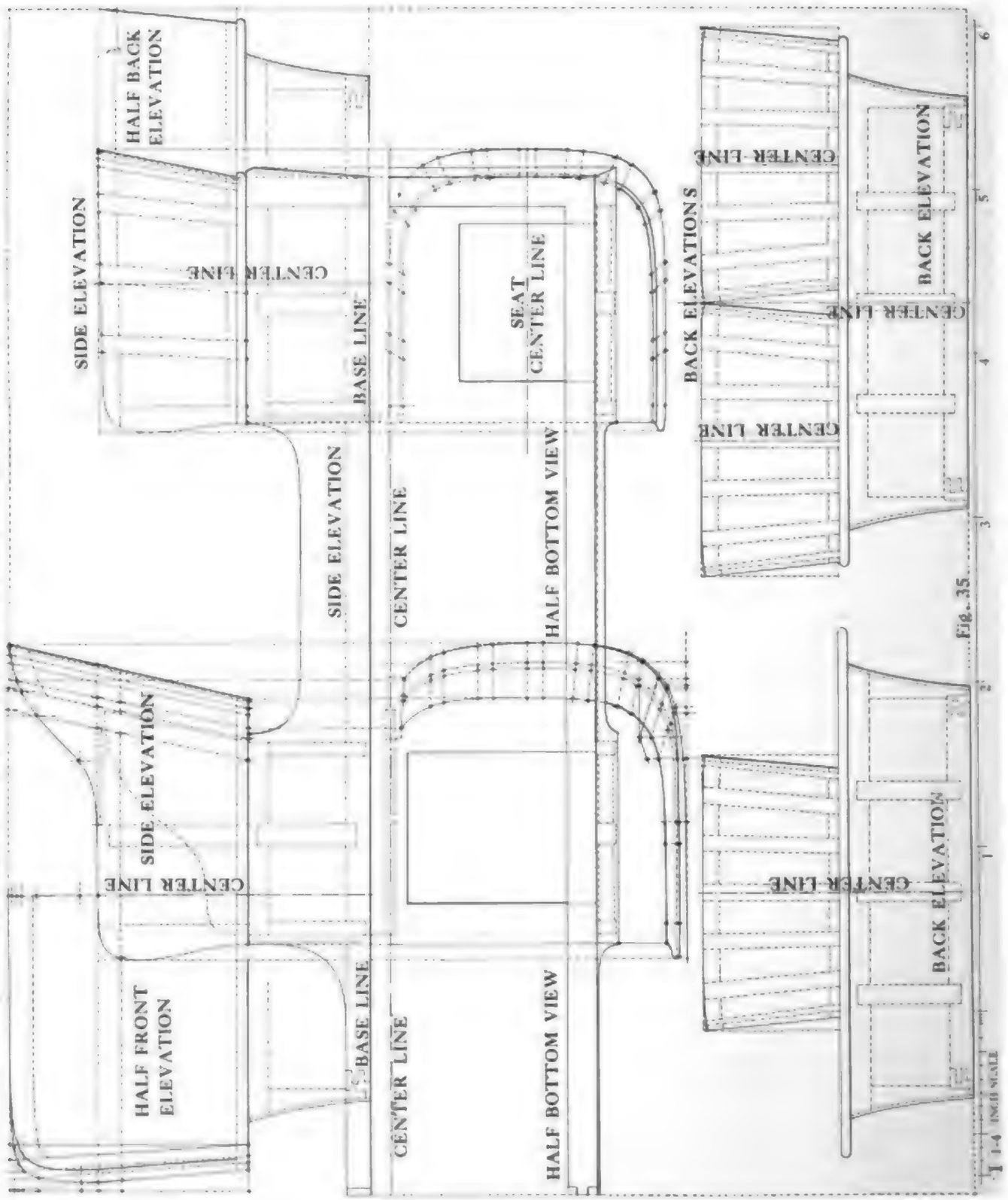


Fig. 35.

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The Vehicle Monthly Course in Drafting and Construction

By Charles A. Heergeist, Technical Editor and Draftsman of "The Vehicle Monthly."

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Subjects Treated in Previous Numbers

Part E—Lesson	1—Laying Out a Plain Board Seat	Part E—Lesson	19—Obtaining Lengths, Heights and Curves by Triangulation
" — "	2—Framing a Four-Cornered Seat	" — "	20—Obtaining Lengths, Heights and Curves by Triangulation
" — "	3—Framing a Round-Cornered Seat	" — "	21—The Creation of Bottom Curve, Length of Spindles and Position of Rails on Bottom View, by Intersections
" — "	4—Laying Out and Framing a Two-Passenger Seat		
" — "	5—Laying Out and Framing a Twin Seat	" — "	22—Diagram of a Round-Cornered Seat
" — "	6—Constructing Round-Corn'd Seats with Strips and Boards	" — "	23—Obtaining Lengths, Widths and Shapes of Seat Panels
" — "	7—Constructing Round-Corn'd Seats with Horizontal Joints	" — "	24—Obtaining Curves of Seat Panels Direct from Bottom View
" — "	8—The Laying Out of Proportional Corner Curves	" — "	25—The Concentration of Diagrams
" — "	9—Establishing the Concave Surfaces of Seat	" — "	26—Obtaining Shape of Panel on High-Back Seat
" — "	10—Length and Shapes of Concave-Convex Seat Strainers	" — "	27—Straight and Convex-Concave Turn-Unders
" — "	11—Length of Spindles on a Round-Cornered Seat	" — "	28—The French Method of Laying Out Square-Cornered Seats
" — "	12—Lengths of Seat, Spindles and Position of Rails	" — "	29—Non-Contracted Panel Seats
" — "	13—Panels on Inclined Square-Cornered Seats	" — "	30—Contracted Panel Seats
" — "	14—One-Piece Metal Seat Panels	" — "	31—The Contracted Brougham and Limousine Doors
" — "	15—Shape of Panel Taken Direct from Bottom View	" — "	32—The Contracted Brougham and Limousine Doors
" — "	16—Laying Out a Square-Cornered Spindle Seat	" — "	33—The Contracted Brougham and Limousine Doors
" — "	17—Seats with Straight and Inclined Surfaces	" — "	34—The Contracted Brougham and Limousine Doors
" — "	18—Round-Cornered Seat Panel with Vertical Surfaces		

Part E——Lesson 35
Working Draft of a Runabout Body

(For Working Draft see page 34)

Explanation. Fig. 35. Working drafts are used in practice as a guide, and bodies are built from these drafts in the carriage and automobile shops. Working from the drafts depends on the ability of the body builder and the draftsman; but in almost all cases such working drafts are not made complete, as they do not contain the shapes, inclinations and contractions, lengthening and thicknesses of all the pieces of which the vehicle bodies are composed. Generally the most difficult pieces in the frame work, or structure of the body, containing curves, laps, mortises and tenons are not on the draft at all, although these are of the most importance in framing the various kinds of bodies and seats. For this reason it required twenty-six lessons in this course to give some of the details of construction, as for instance, the dihedral angles, constructing the patterns with their varied changes for inclinations and contractions; round, two- and four-cornered seats, various shapes of automobile seats with different methods of construction. Other subjects presented were obtaining the curves and lengths of strainers or spindles; obtaining the shapes of wood or metal panels on square and round-cornered seats, including the regulation of side surfaces of bodies and seats. These are all most important in body building, and should be not only carefully learned, but practiced at the same time.

Most of these charts contain difficult problems, and without practice they will not be thoroughly understood. For this reason with almost every lesson there is a problem given, by which the diagram can be proved and put in practice for immediate use in the vehicle body shops.

A difficulty in practice is the concentration of lines for the various parts in the structures. Many of the most important details come so close to one another and sometimes on top of one another, so that it is very difficult to read the draft correctly. For this reason some draftsmen use different colors, so as to distinguish the side elevation from front or back elevation, and especially the bottom view and its various details, which has been a great help to body builders. Another drawback has been the paper on which the drafts are drawn; this tears easily and shrinks or expands. A substitute for drawing paper has been found in sheet aluminum, on which the lines are drawn with India ink instead of with pencil, and besides black several other colors of ink are used.

On Fig. 35 the front view of seat and body and also the back view are partly drawn into the body to save space. In most cases not only the end views, but also the bottom view, is drawn directly into the side elevation to reduce the space on the working draft. For this reason it is desirable that the drawings should be made in different colors to distinguish the various views.

The framing of the body of the various pieces is shown on side elevation, front and back elevation and bottom view, in dotted lines. The framing is most important, but if the body builder does not know how to lay out the pieces on the draft and dress the pieces to the correct shape the framing cannot be done, so that the parts will fit in place. All pieces inclining in one or in different directions, besides being contracted, change the length and direction of the shoulders. If our foregoing lessons are not thoroughly understood by the students, it is very difficult to frame certain pieces so that they will fit properly when the body or seat is assembled.

PART E—LESSON 36 WILL APPEAR IN THE APRIL NUMBER OF "THE VEHICLE MONTHLY."

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Painting and Finishing

Painting and Finishing as Viewed at the New York Shows

At the New York automobile show in January held within the spacious Grand Central Palace, and the motor truck show held in the Eighth Coast Artillery Armory, New York, visitors stepping for a little time from all the walks and activities of life, were permitted to witness perhaps two of the most notable exhibitions of vehicles ever brought together.

The painting and finishing and decorative effects displayed upon this great aggregation of vehicles were in many respects most notable. A visitor after looking over both shows voiced his convictions that, apart from a few really new colors employed to set forth the charms of some of the sport models at the Grand Central Palace exhibit, there were actually no new colors displayed.

What the gentleman meant, specifically, was, as we interpret his phrase, that the possibly new shades and hues and tints were simply derivatives from the colors which we have been familiar with for a great many years. In other words, through addition and subtraction the color grinders have turned out a vast issue of pigments which are old friends in a new garb and prospering wonderfully under new and attractive titles.

Gayer Colors Are Shown

Nevertheless, it is to be remarked that there appeared a distinct gayety in the general color tone of the shows. At the Grand Central Palace, to be sure, there was to be seen a very splendid display of the deep, beautiful greens, and blues, and maroons, and browns, with a sprinkling of black. On many of the larger types of cars where two or more colors were employed, black shone magnificently on many of the upper panels when high-lighted with blue or green or maroon.

These dark, wonderfully compelling pigments in colors with which the public has been acquainted for practically all the years which lie behind, have a following unfailingly enthusiastic, as they well deserve to have. For a strictly aristocratic conveyance, dignified and having a distinction most unmistakable, these deep, subdued, and, under all circumstances, elegant colors, remain unsurpassed, and for the most part unequalled. This is the reason, mainly, why these colors remain, as they have remained for so many years, at the very forefront of popularity.

They are colors, moreover, which take a little lining work to fetch out some of the effects which are only discernible through the medium of contrast. These deep, genteel pigments do not bear much striping or lining work; they become overloaded quickly and thereby suffer a falling off in quality of appearance.

In addition to these deep, alluring old-time colors, there came trooping along in the display a great multitude of colors which might properly be termed the by-products of these dark-complexioned pigments. And as above stated, they were served in almost every variety of shade, hue, tint and tone. It was this variety which made the exhibitions notable; it was also this variety leading away into a picture of more gayety than has been for some years displayed that gave pleasure and a fine measure of satisfaction to the visitors. This gayer tone served as a notice that the world war has glided into history, and that henceforth more of the lighter colors are to be used.

The Greens and Blues

In greens and blues there were many light tones shining resplendently under the illuminating fine lines which picked up and set forth with greater emphasis the real quality of the field color. In the lighter blues the painter was able to see results of a better grade, for he does not forget that the lightest blue which the public can be satisfied with is the pigment most easily developed on the surface without detriment to the purity of the blue.

Light blues are less affected by the varnish applied in the finishing than the deeper toned ones; the dark blues, as a rule, being greatly discolored under the average flow of both rubbing and finishing varnish, unless extraordinary precautions are taken.

Aside from these shadings and tonal effects produced from the blues, greens, maroons and browns, there were in evidence not a few light yellow, deep chromes, buffs, cadmium-toned yellow, and orange, which under attractive names some appropriate lining work and a finish of more than ordinary merit, riveted attention. There were some most attractive reds, many of them being of the deep, brilliant sort which under an ivory white and a distance black line, shine radiantly.

A few flashy reds gave the visitor a vivid impression especially if he chanced to be interested in the sport models.

In grays there were to be found a considerable range of tints and shades. The grays are still popular, and deservedly so. They have durability, which is a big asset in the estimation of the car buying and using public. They are neutral in respect to seasonal effects, as they are also neutral in their effect upon the surface, creating no artificial increase or decrease in the size or conformation of the car. They show dirt and dust less than almost any other color and are, on the whole, quite as easy to keep in presentable condition as any known pigment. The grays shown carried various titles, and when striped, as many of them were, looked very handsome and fit to make royalty applaud.

Deeper or lighter shades of the field color were employed to stripe the gray cars; also Tuscan red and Indian red, and deep maroon lines were most attractively displayed. Ivory white and silver white lines cast in widths to comport correctly with the extent of the field color yielded admirable effects.

In browns there were a number of especially captivating shades, the amber and golden type being noticeable; these light and brilliantly toned browns become unusually attractive when striped with lines of gold and black. Not many of the deeper shades which several years ago seemed to find much favor were to be found in the assembled brown family. However, browns are useful colors and they are good wearing pigments, as a rule, and show plenty of smart effects when lighted up with a sparing amount of lining work.

Fine Display of Lakes

In lakes the show gave a number of fine examples; possibly not as great a display as in some former years, but enough to prove that the lake family, as a whole, is still with us. The fact that in some cases these lakes in price are fairly prohibitive will explain the exceeding conservativeness evidenced in their employment.

As panel colors the scarlet and crimson and purple and carmine lakes represent probably the leaders of the family. We are inclined to think, nevertheless, that all of the lakes need a most artistic color setting to display their richest charms. Hedged about with other pigments of less brilliancy as a means of shadowing the color intensity of the lake it is given to reveal magnificent effects.

Lakes prosper best, considering them as a whole, with a minimum amount of lining work, and that to be of the very acme of correct form and finish, in colors harmonizing perfectly with the field color.

The vehicle painter would be quite at a loss not to have the members of the lake family to select from in presenting his offerings to the public. To the car owner who is searching for something different from the rank and file as a color for his car, or cars, the lakes furnish a big field for choosing.

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A sport model car displayed a finish that appeared to attract much attention on the part of those who are engaged in looking for novelties. The car in question carried a mottled effect which gives one the impression of looking at a surface of polished granite. The color scheme is said to wear nicely and does not become tiresome. As a purely sport model pigment this mottled effect is at least unique.

Quality of the Finish

As to the quality of the finish shown at the Grand Central Palace it may be said that it proved quite the equal of that noted in previous years, and distinctly in advance of that which characterized the exhibit of 1918. As a rule the finish displayed on the cars at the 1920 show proved exceptionally good and in many cases it has never been surpassed at any previous show in this country. The surfaces were well rounded out and perfected in most pleasing form and condition, and indicated unmistakably that they had been carefully brought up and topped off with plenty of thorough-going surfacing processes. And following these operations it was at once evident that nothing had been neglected during the varnishing and finishing stages of the work.

Just as the two shows in New York proved to car-wise people that more dependability and greater strength and finer motors and continuous worth are being built into the present-day automobile and motor truck, so, too, the painting and finishing must correspond in quality and value. The dependable car must have, inevitably, dependable painting and finishing, and these two great exhibitions have witnessed the idea in the color, surface and finishing effects, which the vehicle builder has determined to make a leading factor in his constructive work from now on.

Striking Colors at the Truck Shows

At the motor truck and commercial vehicle show at the Eighth Coast Artillery Armory there were color effects galore, although for the greater part it was manifest that the pigments employed had been selected from the standpoint of usefulness rather than from a purely ornamental angle. Practically all the colors—or a great number of them, at least—which were visible at the passenger car show could be found at the Armory, along with some which were not present at the latter.

Many of the colors of a modest type looked strong and fine and gave the vehicles upon which they were used a substantial appearance. This proves, in our estimation, the real value of a color for the motor truck, and if, in addition, it is able to convey some measure of advertising, so much the better. And not a few of the colors at the motor truck show accomplished precisely this effect.

Pictorial effects, advertising sign work, ornamental features, fine painting and finishing results in general, characterized the exhibition, and it should prove a help and an inspiration to all vehicle painters, and to all people interested in the painting and finishing of present-day vehicles. It is a sure sign that there is an increasing demand for strictly high class work in painting and finishing.

Automobile Show Pointers for Painters

The outstanding fact elicited from the great automobile shows held in New York, Chicago, Philadelphia and cities of lesser size is that the day of the rapid depreciation of the automobile is passing swiftly; engineering and construction work now seem directed to developing durability. The consensus of opinion is to the effect that we have had our days of poorly built automobiles; that henceforth the great aim must be for continuous performance and leading value.

We are being taught that automobiles are being sold today not to please the faddists who seek a new car every six months or a year and never know any of them well, but to last for years, as does a house or any other primary necessity. Dependability and permanent worth are recognized merits of the car.

All this is of prime interest to the painters and their patrons, for it means a demand for a better class of painting and varnishing repairs to be applied to the cars; with that demand it is natural to expect a higher scale of prices, so ultimately there is to be satisfaction all around.

Better Rewards in the Painting Business

The vehicle painter is particularly happy over the prospect of being asked and properly paid for doing better work; the rank and file of men engaged in doing a repainting business are not satisfied with doing a cheap class of work. They know well that such work is not in the end profitable; that it is almost certain in some way to discredit them in the estimation of car owners, as it surely does.

A new incentive, therefore, comes with the announcement that cars are to be built in a more dependable and trustworthy manner, for the painter is aware that the owner of this type of car, when it has reached a condition for painting and varnishing repairs, will wish to have a job of work to match in quality the merit and dependability of the vehicle.

It is easy to note, as a result of this betterment in automobile value, that the painter is to profit quite in the same ratio as the builder has profited. Good work invariably furnishes greater profit in every way, and not least of all financially, than does the cheap and shiftless methods.

As a result of this clearly indicated improvement in automobile construction and painting and finishing, the repainting business must afford opportunities which have not been at hand previously. The improved work to be called for will permit of greater refinement of details along with a superior attainment of good general results. And this, we take it, is precisely what the car-using public chiefly desires at the hands of the painter.

It has been noted as a feature of the show season that as a rule the surfaces have unmistakably indicated a very excellent grade of primary and intermediate and final surfacing; this, as the experienced painter fully knows, is the real basis of good finishing.

In the past he has not always been able to carry the practice out to its logical conclusion by virtue of the prevailing price schedules. Nevertheless, he has not been ignorant of the actual requirements in the case. In times past we have heard much concerning the sinking in and loss of lustre of the finishing coat; of the impoverished depth of the finish, etc., but the unanswerable verdict of the issue has been, in the great majority of cases, that both for want of time between coats, and of material, the finish has failed to get the sufficient backing necessary to hold it bravely out in the open.

The surface that has been built up with plenty of coats of material allowed to dry and mature to a prime condition is well qualified to support unfailingly the finish built over it. This, in fact, is the real acid test, as it were, of the finish. If the material is of a quality above suspicion and all these things have been attended to with deserved care for the details, it is rarely that we find failure. This is one of the teachings of the show season. Another is that the striping on high grade work is never used to conceal defects of the surface.

Striping and Ornamentation

The decorative effects are employed to co-operate with all the other processes for the purpose of a result each part of which is capable of proving its own merit while being benefited by the aid of all the others. On the cheaper class of work, as the historic days of the horse-drawn vehicle have clearly proved, striping is usually employed to conceal surface defects or to at least attract attention from such defects. Indeed, this lining work is used to accomplish both purposes, and correctly so.

It is well to draw a distinction between the two purposes for which decorative effects are employed, and to teach the car owner the distinction; it will serve many times to make him more reasonable, and the reasonable car owner is always a fine customer.

The monogram is an ornament which is being largely used just now upon the good type of car. It is not being used in large form; rather is it being drawn in a smaller figure, as a rule, than formerly, and the relief colors are being made to set off to better effect the field color. However, as in the surfacing and other processes, this monogram display should be most accurately and

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daintily presented. Heavy lines and slouchy pencil touches simply encumber the surface and spoil the effect.

For the business painter this field offers an opportunity for development of exceptional advantage, and he has no reason to neglect it. It will enable him to enlarge his trade on strictly important and profitable lines. Decorative effects bring at the present time a commanding price. Moreover, ability to do this work attractively may be counted on to fetch the best class of trade to the shop.

The application of French imitation cane work in the large and middle-sized cities presents another branch of work for which big prices are being charged and obtained. This cane work is put on with a striping and ornamenting pencil, line upon line, after the manner of Brewster & Company, and in New York anywhere from $200 to $300 per car is obtained, the price depending upon the amount of work applied.

Value of Varnish Color

In the latest practice of vehicle painting much stress is being laid, as the shows of the present season have taught, upon the value of varnish-color as a means of producing the most brilliant and genuinely correct color effects. It has come to be accepted usage to employ above the first coat of color varnish color right up to the final coat of rubbing varnish.

This method was formerly not so closely followed as at present, but it has been found the one certain and practical plan of maintaining the original purity of the color, and of increasing the depth of the brilliancy of the pigment. There is a danger, of course, of overloading the varnish with color, in which case both the brilliancy of the color effects and the quality of the finish must inevitably suffer, if it is not completely destroyed.

It has been said recently that to a pound of rubbing varnish it is in order to add four ounces of color, with a proportionate decrease of the color amount for the following coat. For strongly opaque colors like brown or green or some of the reds, we are inclined to the belief that there is too great a percentage of color. Three ounces of pigment to a pound of varnish in the case of such pigments would be amply sufficient, and it would give the varnish a fair chance to illumine and put increased lustre and brilliancy into the mixture.

For the next coat of varnish-color reduce for the solid or so-called opaque colors the percentage of pigment to one ounce to each pound of varnish. If the rubbing varnish coats are to be continued for four coats then make the color percentage for the third coat one-half ounce of pigment to the pound of varnish. We are here counting the pound as being equivalent to a pint. This will continue to intensify and increase the lustre of the field color.

The last coat of rubbing varnish may for most colors be allowed to go clear, especially if striping or decorative effects are used. If the latter are to be omitted then by all means use one-half ounce of color to one pound of varnish for this coat just as a certainty of keeping the color true to shade. And positively in the case of the semi-transparent and transparent pigments, and in the blues of practically every shade, it is most urgent that at least one-half ounce of the color to a pound of the varnish be employed; these colors go off shade and tone at the slightest prejudicial effect, and the only safe way is to retain a fraction of pigment in the varnish up to the finishing coat.

In the case of white and pale yellows and creams and ivory white it may be found necessary to use a bit of color even in the finishing coat of varnish unless striping is to be applied. If any lining work is called for upon these colors it will be required that it be applied prior to the application of the finishing coat of varnish.

This, manifestly, is not quite in line with standard practice, but in the example of these exceedingly delicate and more or less transparent pigments it becomes necessary to step aside from the ordinary routine of processes to meet the circumstances.

Really it is the better practice, and more consistent with the requirements of the situation, even to use some of the pigment in the finishing coat of varnish, or in an elastic rubbing varnish substituted for the finishing varnish, and then when this varnish has dried, to rub it to an eggshell lustre or to something a little brighter. Stripe as desired and then pencil varnish the decorative effects. Especially do the ivory white, the creams, white, and the palest yellow pigments invite this treatment.

From the recent shows the deduction is to be drawn that clean finishing is valuable for more than merely the sake of appearances. It is valuable as a durability asset. The matchless finish which for years has been the wonder of the small town painter proves its worth quite apart from its compelling attractiveness. It has made apparent the fact, above all other facts, that the clean finish has a capacity for wear entirely unequalled by the finish not so clean nor so faultless.

The finish saturated with atoms of dust and dirt lacks the resources to live long in the warfare of service which the clean finish contains. The physical structure of the dirty finish denies it this privilege.

The Natural Wood Finish

In many of the fine family cars there are still to be seen not a few examples of natural wood finish. Unfortunately many of these examples are most badly finished and serve to give the car a "black eye." In the natural wood finish the one thing above all others is to have the wood completely filled; if it is not so stopped and the pores sealed tightly the finish, regardless of the number of coats of shellac and varnish applied, is certain to look impoverished and lacking in something which the layman may not be able to explain but which he is sure exists.

There are very few woods which do not require a filler to stop the pores and grain. As a matter of fact we do not at the moment recall the name of a single wood now being employed in automobile construction which is so densely grained and knit together as not to need the application of a filler. Formerly, at rare intervals, a wood came into use which a mere filling with shellac made sleek and fine when the necessary varnish coats found a place on the surface. This observation does not hold true today. And for this reason we advise our readers to make sure to have the grain of the wood completely filled before proceeding to apply the coats of shellac.

Another feature of the wood finish is to secure the correct color for the filler; an off color filler is capable of wrecking the entire job. If mahogany, or walnut, or any one of half a dozen other distinguished woods, or types of finish, the color effect should be secured precisely as to shade and tone prior to going on with the shellac coats.

We may have our doubts and misgivings concerning the use of shellac over the filler, but this we do know for a certainty tha. there is no other substance which may be employed to so quickly and effectually build up a foundation over which to cast the varnish coats. The shellac is a most wonderful sealer once the grain and pores of the wood have been choked full of a filling material; and it permits of building up the foundation so quickly, whereas with varnish the process must go on much more leisurely with a greater consumption of time. For a good finish not less than four coats of shellac will suffice for new wood. Over this foundation three stout coats of varnish provides a surface to rub and polish upon which should give most satisfactory results. Each coat of shellac will require a thorough sandpapering; this will be found the basis of good natural wood finish, and it helps rapidly to fetch out a level and smooth foundation upon which to flow the varnish coats.

Maintaining Color Purity

A reader of this department writes for information concerning the above topic. To keep the original purity of color through the various processes which must necessarily be practiced in developing the finish, is no small task and calls for constant vigilance. Practically all colors are subject to change under the application of the numerous coats of varnish; some more so than others, to be sure. Even black, the most unassuming of all pigments, is not immune to the discoloring properties of varnish, and under successive coatings it becomes an amber shade and later takes on a decided brownish cast.

Blues are very much discolored by the ordinary flow of varnish; as a matter of fact dark blues, unless expedients are resorted to, are positively ruined by varnish. The lighter blues are not so badly affected by the varnish flow. This explains why most painters of experience urge the use of lighter blues whenever possible.

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Pale yellows, ivory white, light shades of brown, light and medium shades of red, and maroon, and practically all shades of green, are almost immediately affected in purity of shade and tone by the flow of varnish.

Color in Varnish Up to the Last Coat

The one thing which the painter must do in order to retain so far as possible the original purity of color, is to make use of varnish-color up to at least the last coat of rubbing varnish.

In all cases where lining work is not to be employed it is good policy to keep a little of the color in the varnish up to and including the last coat of rubbing. This will insure for most colors a retention of tonal and shade purity entirely satisfactory, and it will also aid to keep these desired qualities in view as the car stays out on the road through many months of service.

A uniform shade and tone of color throughout the surface is most desirable. As a help to this end it should be the rule in making up a color—speaking now of special colors which are prepared to the order of the car owner—to prepare an ample sufficiency of the pigment not only to cover the car under treatment but to provide a portion for retention for subsequent needs, if called upon for a supply. This will guard against falling short of enough color to coat the surface. When such an emergency arises and it becomes necessary to make up a fresh supply of pigment the chances are that the last lot may prove off shade as compared with the first lot. Too much care cannot well be given the maintaining of the color purity, for the color is to the car what Hamlet is to the play.

Painting and Finishing the Chassis

In former issues of THE VEHICLE MONTHLY we have called attention to the apparent risk taken by many painters and corporations whose chief business consists in repainting the automobile and truck equipment, when it comes to developing the finish upon the chassis. In this work the view should be taken that a fine balance of results must be established between the body of the vehicle and the running parts or chassis.

Even the late shows exhibited, in some instances, an amazing lack of regard for the harmony which should exist between all parts of the vehicle.

There is small excuse for this condition of painting and finishing affairs; one of the rules of vehicle painting has always been, so far as our experience goes, to respect and appreciate alike all parts of the vehicle, and to establish a uniform quality of finish throughout.

Upon the highest class of vehicles, and by makers of national reputation for superior quality of output, it will be observed that the chassis are given quite as splendid a finish as any other part of the car. This practice may well be accepted as one which all may with profit follow unreservedly. These parts of the vehicle are exposed to an unusual form of vibration, oscillation and road strains, and in view of this surface wrecking service the finish should be based upon a foundation and body of material amply elastic and given every possible safeguard.

The foundation coats must carry enough pure raw linseed oil to insure their staying in place and holding other coats in place as well. Above these so-called foundation coats are still other coats which are an indivisible part of the finish, and these, too, must be made to carry their pro rata of elasticity furnished by the raw linseed oil. Not that we should advise an excess of the oil medium; simply enough to give the entire fabric from first to top coat a measure of elasticity equal to all the demands made upon it.

And in the processes applied, from coating to sandpapering and glazing and refining to the desired limit, the needs of the surface should be well in the foreground, for in quality of appearance the finish should correspond to that established for the body of the vehicle.

To say that the parts are below the line of vision and that they are half rounded and of flowing lines and therefore not in need of the high class results to be sought for on the body of the vehicle, is begging the question.

Why not apply a better grade of painting and varnishing, as an average, for these parts and thereby balance up appearances and quality? There is both profit and satisfaction in it.

Flaking and Peeling of the Finish

In automobile and motor truck painting at the present time there are so many brittle materials employed, through the grinding in japan, that flaking and peeling of the finish has become a common weakness. This weakness has become more pronounced since the horse-drawn vehicle has been superseded by the horseless one, due, for the greater part, to the additional vibration and surface strains which the latter equipment imposes upon paints, colors and varnishes.

The greater sweep of surface outlines which characterizes the horseless vehicle provide for the extra vibration which is part and parcel of the automobile and truck equipment. The long wheel base and body construction invites a form and extent of oscillation and surface strain almost foreign to the horse-drawn vehicle.

Such, then, are the factors which must be taken into account by the painter today. That thus far he has not been able to control this fault must not be attributed to any negligence on his part. It simply represents a form of paint shop trouble which, through apparently unavoidable circumstances, cannot be throttled forthwith. What the painter is making an effort to do is to keep the average of these surface ailments at a minimum volume. In order to do this it is found necessary to get as resourceful and vigorous a base for the color as time and opportunity and conditions will permit.

It is most essential that all the elasticity possible be provided the primary coats and that these coats be given the extra limit of time in which to dry. We have found it a most workable plan to furnish all such coats a couple or three days additional in which to make the drying more secure and certain, and then to hasten—even to crowd—the drying of the color and the varnish coats. The color coats being ground in japan makes this practice easy so far as they are concerned; and with the varnishes now supplied to meet all the varied needs of the painter it is no longer difficult to use a brand of varnish exactly suited to the pressing requirements of the situation.

There are many rather quick, hard drying finishing varnishes available for use to meet emergencies or ordinary situations. In rubbing varnishes one has choice of a great variety made to meet varying circumstances.

With the base of the paint structure corrected and rendered secure, we then have through the use of these other materials, quick or medium drying as desired, a means by which to prevent to the maximum degree the flaking and peeling of the finish, otherwise the paint and varnish structure. Why not use these means?

Paint Shop Economies

This is a day when even little economies swim in big figures before the eye. The constantly increasing price for practically everything which the painter is called upon to use in his work supplies the incentive for economy. Taking turpentine as an example we find that this thinner is mounting in cost to heights fairly unheard of. Naturally the painter is asking if there is a dependable substitute on the market.

The writer is among those who previously have deemed the use of anything but pure turpentine for thinning purposes an insurmountable mistake. We are no longer of this opinion. During the past two years it has been our experience to try out a number of turpentine substitutes which have performed all of the functions of turpentine; some of these have done so most completely, while others have proved almost without valuable properties.

Today there are upon the market a number of artificial turpentines which have real merit at a cost greatly less than the pure article. These substitutes are sold for exactly what they are. They are thinning spirits designed to take the place of turpentine. They answer not a few of the tests which are supposed to determine the value of turpentine as a thinning medium.

Perhaps for some of the more delicate and sensitive pigments, such as, for example, white, creams, ivory white, and some of the very pale yellows, the substitutes could not safely be recommended as thinning mediums; but for the great majority of colors they will serve without any trouble.

The main difficulty with some of the old-time substitutes has been their lightning-like evaporating properties. In the thinning of colors they made them "short" to such an extent that it was practically impossible to

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lay the pigments over any of the larger surfaces before they "set up" and became "bushy," making a fatal defect in surface appearances. This has been entirely overcome in most of the turpentine substitutes of the present day.

The turpentine substitute, not the adulterated turpentine, offers an opportunity to economize without disadvantage to any of the parties concerned. The chief consideration is to get the dependable and trustworthy substitute.

For cleaning purposes there are a number of oils on the market which may be used in place of raw linseed oil, at less than half the cost of the linseed product. Used in connection with the substitute turpentine these oils have most desirable properties as cleaning mediums. They saturate and lick up grease and road accumulations in a most satisfactory way. Apparently they are well worth a trial.

Producing a Finish Through Rubbing

The question is not infrequently asked why a finish may not be secured more quickly and to better advantage by rubbing the varnish with oil and pumice stone than with water and pumice stone. To those who thus inquire we may say at the outset that the dirt and motes and surface roughage cannot be so completely and effectually rubbed out of the surface with the oil and pumice stone flour; there is lacking the abrasive effect and the leveling capacity and the reducing power which characterizes the water and pumice stone flour rub.

The oil rubbing seems at the time to be doing the same work which the water rub is certain to do, but upon investigation it will be found without exception that the motes and nibs of foreign matter, while beaten down and leveled somewhat, continue to exist and under an additional flow of varnish are certain to poke an ugly face out of the surface of varnish.

The water rub actually reduces the dirt nibs and motes; cuts them off and fetches them down to the level of the surface. It was a fashion a few years ago to let the finish go in an oil rub effect, and for a little space of time car users thought this style of finish quite out of the ordinary and nice enough to please the fashionable set, but it prevailed for only a brief period. It did not stand up, and the mild gloss soon became a smudge and a sore disappointment. Hence, we repeat here that there is no other way known among finishers by which a semi-lustre effect, or a polished effect, may be secured except through the process of first rubbing with water and pumice stone flour, and then for a semi-lustre effect rubbing with the oil and rotten stone or a very fine grade of pumice stone flour.

For the full hand polished effect the surface should be most completely rubbed with water and pumice stone flour and then rubbed and polished with a polishing medium made for the purpose.

Of one thing we may be sure, namely, that the water rub does away with the surface roughage of one form and another, and fits the work for the varnish to come after.

In the rubbing of varnish there is this to be considered: permit the varnish to dry and mature thoroughly before rubbing. If the varnish comes as a three days rubbing it is a wise practice to give an extra day to make sure of the condition desired. The immature and imperfectly dried varnish cuts through sometimes without just provocation; it also shreds and fractures. Prevention of these troubles is secured through letting the varnish dry to a perfect state before subjecting it to any processes of reduction.

Details of Surfacing

In repainting over an old surface it should never be the practice to coat in a field carrying any considerable gloss; a high or even a moderate gloss has but small affinity for a fresh coat of paint or color, and the greater the gloss the less affinity. Indeed, the glossy surface appears to have no capacity for taking hold of a coat of color or paint. Rub this lustre off, or where permissible, sandpaper it off, and at once you furnish a field fertile alike in its capacity for retention of the various coatings of paint or color and for making all subsequent coats safe and certain to grip fast.

In the haste of getting work along when the rush season is on we are apt to overlook the fundamental necessity of reducing the gloss of the old surface. As a matter of safety this should not be done. We should greatly prefer to have the old surface considerably roughened with fine sandpaper; not, to be sure, gouged and stricken with deep or plainly manifest furrows, but scratched over and full of fine interlacings of shallow canals endowed with a power to receive and grip fast to the new paint or color.

As soon as you get this sort of a field for the new material there need be no further cause to speculate as to the outcome of the venture. Naturally if this old body of material is firm and intact and reveals plenty of vitality we should choose to leave as much of it in place on the surface as can be, for which purpose we should limit the rubbing or sandpapering processes to a bare sufficiency of roughing to make the field safe for all subsequent coats of material.

Surfacing Over the Old Foundation

There is no reason that we have been able to discover why the old foundation, if of a good character and in a healthy condition, should be mistrusted to the extent, as is so often the case, of sandpapering and otherwise reducing the body to a mere shred of its former self, or even to a point where such a condition is threatened.

This old, virile, tenacious, tough film and body of well-knit material may not infrequently be depended upon with greater certainty to give a still further fine account of itself than any new body of material cast over it. Hence we say give the old body of pigment and varnish a fair show and make it a servant for all additional help possible.

In many of the best shops in the country—first-class city custom shops, for example—the practice is followed of saving the surface to the limit of its durability; to give it a chance to work so long as it is able without detriment to the durability and appearance of the finish.

Putty Mixtures for Automobiles and Trucks

It is of the utmost importance that putty for use upon the automobile and truck equipment should be made of not only good materials, but that it should carry a degree of elasticity and toughness of fiber consistent with the service to which it is exposed.

There is the vibration to be met; the oscillation to be overcome and the varied strains of service to be daily encountered, and under these extremes of surface movement the putty must stay in place and refuse to dislodge the finish. In view of these phases of service it behooves the painter to make his putty supply with exceeding care.

Three Good Putty Formulas

A putty that has found favor with many car painters consists of one part whiting of the quality that comes from the top layer in the settling tank, and two parts of dry white lead. Equal parts of coach japan and elastic rubbing varnish are used to fetch the putty to the right consistency for handling conveniently. This furnishes a putty with about the correct elasticity with sure drying and hardening properties.

Another formula consists of two parts of Gilders whiting and three parts dry white lead, mixed to the proper consistency with one part raw linseed oil, one part coach japan and three parts quick-rubbing varnish. This makes a putty that will stick to the final trumpet sound. For a hard-drying and exceedingly close-textured putty use straight dry white lead mixed with equal parts of elastic rubbing varnish and coach japan.

Still another formula covers the use of four parts of oil ground keg lead, one part dry white lead and one part Gilders whiting or for finest work use Paris white whiting. Liquid ingredients, rubbing varnish, medium elastic and coach japan, equal parts. For a putty to be used in places subject to violent strains and vibration use, by weight, equal parts of Gilders whiting and keg oil ground lead stirred to the correct consistency with equal parts of hard-drying varnish and raw linseed oil.

For a facing or glazing putty use equal parts of Gilders whiting and dry white lead worked to the right consistency in two parts each of rubbing varnish and coach japan; one-half part each of raw linseed oil and turpentine.

Another facing or glazing putty is made of two parts dry white lead and one part oil ground keg lead; liquids, equal parts rubbing varnish and coach japan, and then as the mixture is used, adding turpentine to cut the pigment to a slightly flowing-like consistency. Add color to all these mixtures as desired.

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Upholstery, Toppings, Mountings

Upholstery and Finishing in the Buick Factory

Although the chief thing to bear in mind about a motor car is that it is a piece of machinery, it is not enough to say that an automobile has a dependable motor, sturdy frame and correctly-related mechanical units. The strength of these features expresses in a measure the utility of a motor car, but when beauty, refinement and convenience are neglected a motor car lacks elements which might be considered essential to true satisfaction and comfort.

Buick engineers and designers have long realized the fact that genuine utility is a composite thing. Just as unwavering as they have been in the development of a serviceable car, so have they been consistent in the development of a beautiful car and a comfortable car. And in Buick Valve-in-Head motor cars for the present season the highest mark of this many-fold development is reflected.



The bodies pass through the ovens at the proper speed to insure a thorough setting of the paint. This view shows bodies leaving one of the ovens and passing to the next painting deck.

Increased comfort can be seen in the new body types; greater convenience in the equipment and appointments and beauty in the graceful lines and handsome finish—all of which have been made possible by the efficient methods employed in the Buick factories.

Consider, as an illustration, how it is possible for Buick to give bodies the rich lustre and leather upholstery for which they are distinguished. Let us folow a Buick body through the finishing and upholstery departments.

Each Buick body is, first of all, constructed right. The frame and sills are made entirely of selected oak and ash reinforced with numberless iron braces. To this frame is secured the perfectly moulded sheet metal covering which binds the whole together and forms the basis for the smooth exterior finish. Before paint is applied to the metal, the body passes through the sand blasting department on its way to the finishing stages. In the blasting room streams of fine sand under great pressure are played upon the body to remove all traces of scale or foreign material that might cause a mar in the finish. The body then comes out with a clean, pebbled surface and passes on to the first painting.



The first operation in the Buick finishing department is to cover the two coats of rough paint with the first layer of finishing color. After the paint has been "flowed" on, the body moves on a conveyor through the baking ovens.

In the primary paint stage the body receives a coat of rough paint which fills up the pebbled pores in the metal and gives a firm surface for the color paint. The first coat is dried in a huge oven and a second layer of heavy paint is applied, which in turn is baked or set in an oven.

After the second rough coat is dry, the body moves along to the first color deck. Resting on rollers it stops in place above a large pan and a skilled workman immediately begins to "flow" color over the body surfaces much after the manner a man in washing a car sprays the body with a stream of water.

The "flow" method of painting is one of the secrets behind the smooth finish on Buick bodies. Flood painting gives a thicker and a more evenly distributed layer of color over the surface than the obsolete hand or brush method of painting. And the new system not only saves time, but also saves paint.

Surplus paint drips into a pan and runs into a clarifier, which separates foreign substances from the paint so that it can be used over again. Consequently there is less waste and more layers of better paint can be applied at virtually the same cost of several layers of lower-grade paint by the old method.

When the body has been completely covered, it is released from its position and is carried by an endless chain conveyor through a long oven. The body moves at the right speed to permit estab-

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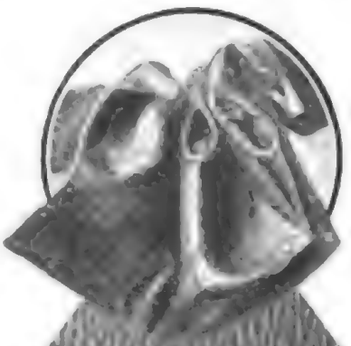
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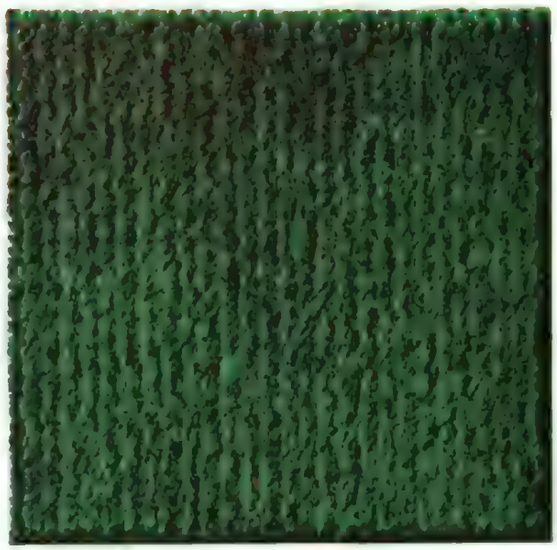
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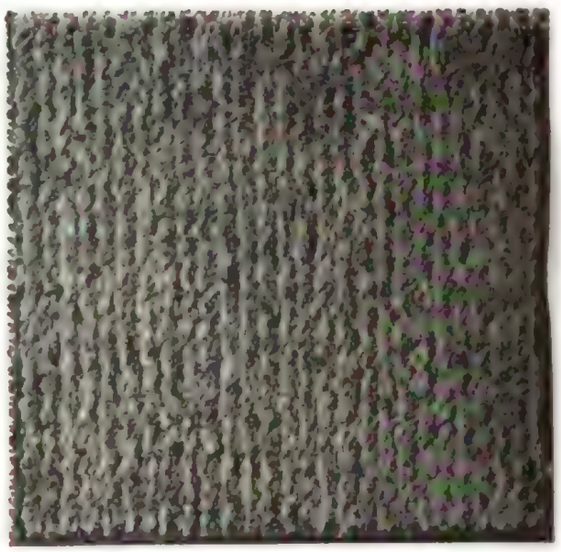
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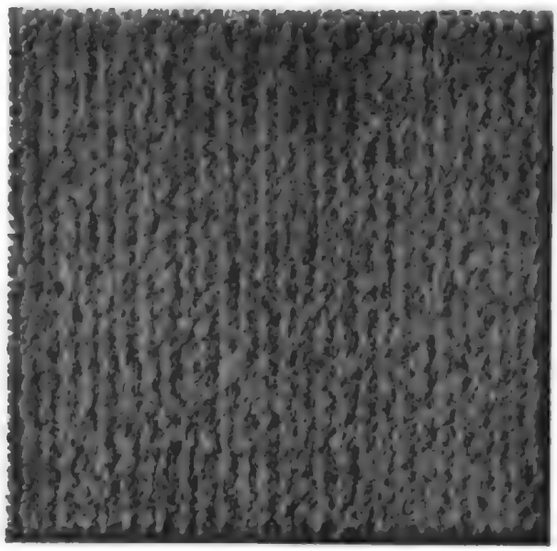
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When Buick bodies have passed through all the stages of color painting and drying, they are mounted on small four-wheel trucks. This illustration shows the bodies leaving the last color oven.



On the four-wheel trucks, bodies are sent to the rubbing stages, where workmen with a mixture of powdered pumice stone and water carefully prepare the bodies for the smooth lustre of the final varnish.

(Continued from page 42)

lished conditions within the oven to firmly set the layer of paint. Under the common plan of finishing, bodies are stored between painting stages in rooms at prevailing temperatures, and climatic conditions naturally have a great deal to do with the thoroughness with which a job is painted.

But, under the modern method of using a conveyor system in carrying bodies through a baking oven, absolutely nothing is left to chance. Correct temperature can always be maintained.

When the body has passed through the first oven it is picked up by an overhead conveyor. It then moves to the next painting stage and the next oven and so on until it has received its entire quota of color paint.

On coming out of the last color oven, the body is removed from the overhead conveyor and placed on a small four-wheel truck, which is shifted to a position on the rubbing deck.

The rubbing deck is an excellent example of the care exercised in the manufacture of Buick bodies. The body, as it leaves the oven, could readily be sent to the upholstering and varnishing departments without being rubbed or polished. Perhaps little difference in the body would be noticed at first.

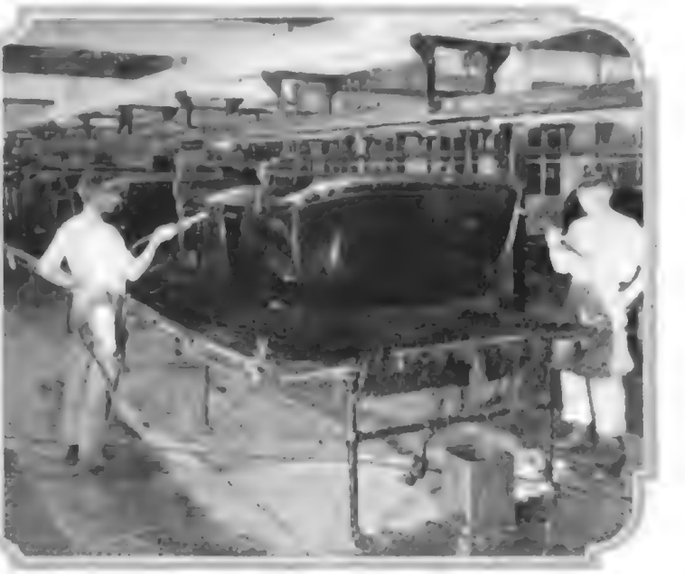
But, by rubbing and polishing the body with a mixture of dusted pumice stone and water, a finishing touch is added to the color surface, which to a large extent accounts for the lasting lustre and smooth appearance of the finished body.

After it has been carefully polished, the body moves on its truck to the upholstery department, where it is placed in line for the upholsterers.

Workmen in the upholstery department are divided into groups, each group having two lines or tracks to work on. While the men are affixing leather, cushions, springs, hair, etc., to the bodies on one line, the other line is being loaded with bodies from the rubbing department. When the men have completed work on the first line, they shift to the other and the upholstered bodies are removed. This method relieves the upholsterers of handling



After being polished, the bodies enter the upholstery department, where adept workmen affix cushions, springs, hair, leather, etc. This view shows men working on one line while the other line is being filled with bodies from the rubbing department.



Buick bodies are again placed on conveyors for the final varnish which gives them a permanent and lasting lustre. The varnish is "flowed" on similar to the color paint.

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bodies and permits them to devote their entire time to the work for which they are especially qualified.

The leather, trimmings, and French pleats stuffed with hair are prepared in an adjoining department and come to the upholsterer ready for the body.

Upholstering and Inspection

Particular care is taken in shaping the cushioned backs for the greatest comfort. Seats, for instance, are always made higher at the front edge than at the rear, affording the most comfortable position for passengers.

The upholstered body is now placed on another conveyor and sent to the varnishing department, where it receives its final coat by a flood method similar to the painting in the earlier stages.

A traveling conveyor connects the body conveyor with an oven track and the body starts on its last trip through baking ovens. It moves slowly and persistently forward, the varnish setting firmer and firmer, and by the time the body reaches the end of the oven the lasting lustre is set.

Inspectors, with the aid of spot lights, examine the body for possible defects or flaws in the finish.

If the body meets with their approval, it advances to an opening in the floor directly over the chassis assembly line on the floor below.

While the body has been passing through its various stages, the chassis which it is to join in forming a completed Buick car, has also passed through systematic stages in its evolution. And so body and chassis meet, when the body is lowered through the opening by a pneumatic hoist, to become a part of a Valve-in-Head motor car, beautiful in design and finish, correct in mechanical construction.

An Elaborate Police Van

(See Illustrations on Opposite Page)

Police officials of La Paz, Bolivia, must ride in state. The dignity of their office demands it. Hence it is that The Garford Motor Truck Company, Lima, Ohio, has been called upon to build what is believed to be the most elaborate police patrol ever manufactured in this country.

This conveyance might be referred to as a "police headquarters on wheels" so complete is it in detail. In order that the chief of police may not have to mingle with the culprits the body is designed with three compartments. One of these is for the chief, one for the driver, and the third for the prisoners.

The chief naturally is much favored. His compartment is furnished with handsome swivel chairs, upholstered in blue leather. On the floor is a rich carpet of blue and the fancy windows are draped with curtains to match. The interior metal trimming is of nickel and among the refinements are an electric cigar lighter.

The prison compartment is much the same as those in American patrols. To make sure that the prisoners cannot escape, rings have been placed in the backs of the seats to which the occupants are to be handcuffed.

All compartments, including the driver's, are enclosed. Each compartment is electric lighted. The exterior of this "hurry-up" wagon is painted in dark blue. A highly polished aluminum radiator adds a bit to the distinctiveness of the car. The equipment includes pneumatic tires, electric lights and other modern accessories. The special body is mounted on a one-and-one-quarter ton chassis, a new Garford model.

Six-Passenger Body

(Continued from page 33)

frame rests should be ⅝ inch thick, making a combined thickness of 1⅜ inches, which would be the size of the pattern, and should also be tapered ⅛ inch toward the top end. The size of 1⅜ inches is on belt rail or 25⅛ inches from top surface of frame.

This sedan body has 3 inches turn-under, including the molding, and the shape of the standing pillars is shown on side elevation near the rear door joint. The inside surfaces of door and standing pillars are curved, but the glass runners are straight and all are 1¾ inches thick. The shape of pattern refers to the coupé pillars, the standing hinge pillar and the door pillars.

The standing lock pillar pattern and the rear end standing pillar pattern are made as follows: Note pattern B, side elevation of sedan body face, where C represents the wheelhouse recess and laps against wheelhouse recess line D, half top view. Note pattern E, side elevation, where line F represents the wheelhouse recess, and G represents the inside surface of standing pillar, and laps over the corner pillar. Note the inside surface of corner pillar on half back elevation, which is same as G on standing pillar. The rear end of circular piece is lapped to the corner pillars and standing pillars, and standing pillars are lapped into the sills. The object is to combine the standing pillars with the circular rails, sills and back corner pillars, to give solidity to the body.

On this body there is a center pillar on rear surface and each window is 22½ inches wide. When all glasses are lowered it makes an open carriage and if more ventilation is required two ventilators can be inserted on each side of top above the doors.



As soon as the varnish is applied, the bodies enter the final baking oven, being gradually carried along by chain conveyors. Climatic conditions within the ovens are so maintained as to firmly set the varnish.



From the varnish ovens the bodies move to the inspectors, who with the aid of spot lights look for possible defects or marks in the finish. If the bodies are passed, they roll forward to an opening in the floor, through which they are lowered by pneumatic hoists to the chassis assembly line on the floor below.

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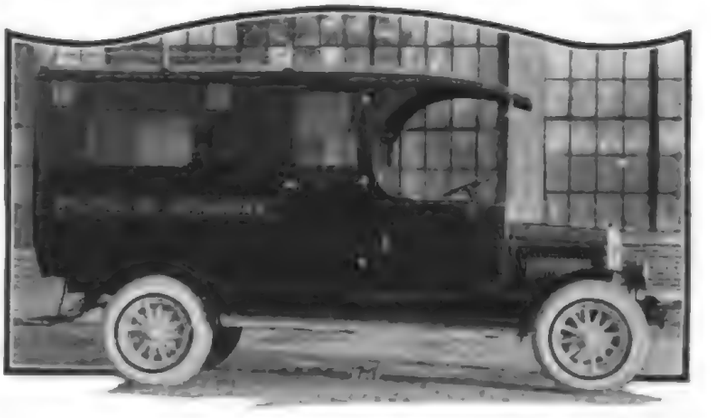


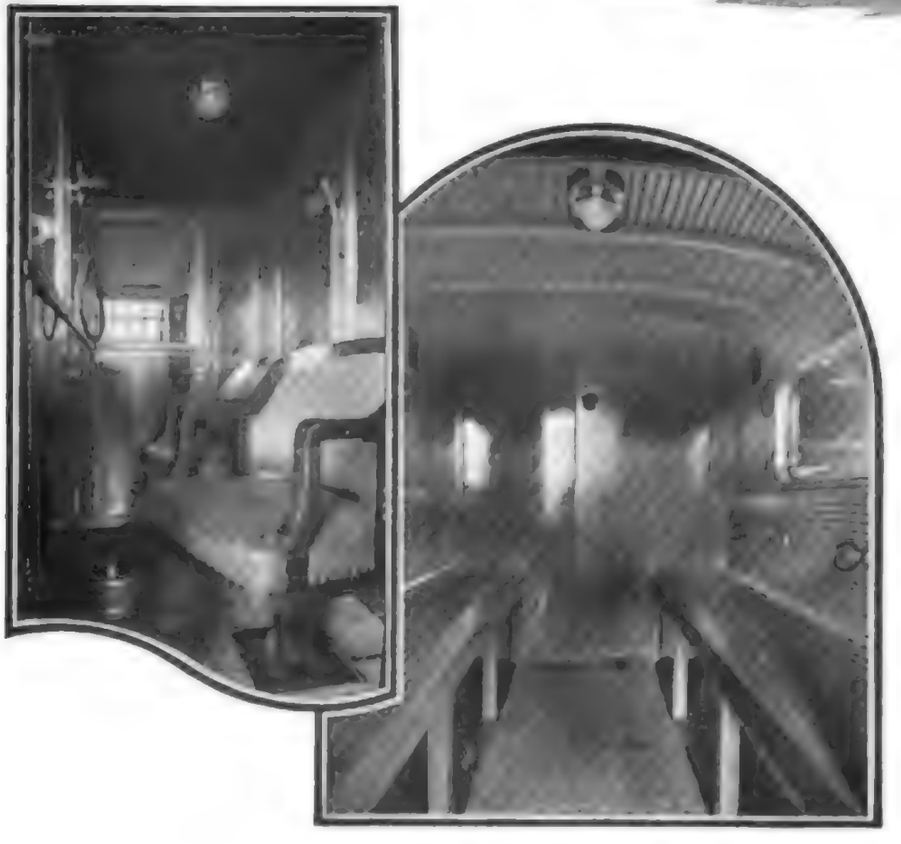
AN ENGLISH RAILWAY OMNIBUS

Salon omnibus with drop windows on the English Thornycroft type J chassis. Entrance is from the front only. Messrs. Hora, Ltd., London, have recently built a number of buses of this type for the Great Eastern Railway Company.

AN ELABORATE PRISON VAN

Culprits arrested hereafter in La Paz, Bolivia, may find some consolation in the fact that they will ride in this patrol just completed for that South American city by The Garford Motor Truck Company of Lima, Ohio. It is probably the most elaborate conveyance of its kind ever built in the United States and has three compartments, one for the Chief of Police, one for the prisoners and the third for the driver.





The panel to the right shows the compartment for prisoners. Unruly offenders will be handcuffed to the rings securely fastened in the backs of the seats.

The compartment shown on the left is for the Chief of Police. It is furnished with swivel chairs, upholstered in blue leather, a rich carpet of blue and drapings to match. Every convenience is provided, including an electric cigar lighter, speaking tubes and dome lights.

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News in the Trade

Our Cincinnati News Letter

Orders for carriages and buggies are plentiful and are being received in abundance by the manufacturers in Cincinnati.

The same "old story" can be repeated, and that story relates to "the deliveries of materials of nearly every description." The situation has now become acute, but the material houses are doing their utmost to facilitate deliveries. It is a matter for the "knowing ones" to solve. The steel mills are booked for months ahead and they do not know where they are, so to speak. Lumber also is very scarce and high in price.

There is but one thing to do, and that is "to sit steady in the boat" and wait for developments. No one should lose his grip in times like these. Prosperity is with this country of ours and it will continue and all will end well, if the philosophical idea is followed up.

* * *

Cincinnati Carriage Makers' Club

The February meeting and dinner of the Carriage Makers' Club took place on the evening of the ninth at the Hotel Sinton, with an attendance of forty-five members and two guests.

President Clen Perrine called the meeting to order at 8 o'clock. The secretary was requested to read the minutes of the previous meetings, which were approved.

The following gentlemen were elected to membership: C. F. Carpenter, of the D. L. Carpenter Co.; J. N. Lutz, of the Eberhard Mfg. Co.; Fred. Luth, of Luth Carriage Co.; G. Walker Toren, of the Spokesman Publishing Co.; Carl Helbig, of the Vulcan Supply Co.; C. I. Bennett, of the Brown Carriage Co.; Edgar Friedlander, stock broker.

The nominating committee selected the following names for Board of Governors for the ensuing year, four of whom are to be elected at the March meeting: I. O. Bauer, of Bauer Bros. Mfg. Co.; Milt. Wieman, of the Brown Carriage Co.; C. B. Hopper, of the National Screw & Tack Co.; R. E. Friedrich, of the Wheel, Top & Hardware Co.; E. V. Overman, of the Standard Parts Co.; Otto Heinrichsdorf, of the Brewer-Tichener Corporation; John Oppliger, of the Phoenix Carriage Co., and P. J. Zimpelman, of the Trailmobile Co.

A communication was received from Mrs. L. D. Lutz, expressing her gratitude for the floral tribute sent by the club, on the occasion of the death of her husband.

Clen Perrine, president of the club, made an exhaustive address along the lines of the program and purposes of the Horse Association of America. Mr. Perrine stated, in part, that the association will expend from two to three hundred thousand dollars each year to advertise the horse, and this sum must be raised from all those interested in the horse. He also urged the carriage and accessory trades to join in the movement and subscribe to this fund. The carriage builders are entitled to two directors in this association, and are expected to subscribe from twenty to thirty thousand dollars toward the fund.

P. P. Hunter, chairman of the entertainment committee of the club, was requested to give the members a talk along the lines of the "League of Nations," inasmuch as the invitation for this dinner and meeting was from his pen, and requested the members to be prepared to discuss the subject. Mr. Hunter stated in part that he hoped the wise men in Washington will look after the country's best interests and settle the question before long, and he hoped there will be no more wars.

Judge F. R. Gusweiler, a staunch member of the club, was present and was asked to give his views of the League of Nations. The Judge stated, in part, that this was a big problem to solve and that Congress should have something to say about any declaration of war; that he hoped the great economic uneasiness that at present is with us will soon vanish; that the selfishness will pass away and that real co-operation will prevail.

Theodore Luth was again elected at this meeting to serve as representative of the carriage and accessory trades in the Division of Manufactures of the Cincinnati Chamber of Commerce. Mr. Luth thanked the members for their support and the distinction. He urged the members to assist the Division as much as possible and fill out their questionnaires recently mailed them by the Division of Manufactures of the Cincinnati Chamber of Commerce, as they are compiling information relative to each manufacturing concern in the Cincinnati district, for a trade directory which will have wide circulation.

President Perrine then called upon the various candidates for office to express their views should they be fortunate enough to be elected. This part of the program was amusing and interesting and elicited a great deal of applause.

Mr. Rennekamp suggested that on account of the high cost of all commodities the dues of the club be advanced. Mr. Robben made a motion that this be referred to the Board of Governors of the club to take such action as they deem fit. The motion carried. There being no further business before the club, same adjourned at 9.15 p. m.

The Cincinnati Carriage Makers' Club is in fine shape numerically and financially, and has just passed one of the most prosperous years in its history. The present officers are: Clen Perrine, president; George W. Huston, first vice-president; C. J. Rennekamp, second vice-president; Emil E. Hess, treasurer; Joe Wallenstein, secretary.

D. L. Carpenter, for many years in the carriage and automobile material business at 652 Main Street, passed away at his home in Reading Road, on January 27th. Mr. Carpenter was highly regarded by the entire community and his many kind acts will always be remembered. He was in failing health for some time, but never complained and apparently was always in the best of spirits. Mr. Carpenter was 66 years old. He was president of the Longview Hospital, and also president of the Foy & Starr Mantle and Tile Co. He was also director of the Tool Steel Motor Gear and Pinion Co. and the Cincinnati Pulley Machine Co. He also was interested in business in other cities. He was president of the Board of Directors of the Avondale M. E. church and a member of the Cincinnati Business Men's Club, Chamber of Commerce and the Carriage Makers' Club. His widow, one daughter, Miss Mildred Carpenter and four brothers, O. J. and C. F. Carpenter, Chas. E. Carpenter, Los Angeles, Cal., and John C. Carpenter, survive.

South Shows Big Increase in Motor Vehicle Registration

That the South is purchasing motor vehicles at a greater proportional rate of increase than the rest of the country has been strikingly brought out in the statistics of registration for 1919, just compiled by the B. F. Goodrich Company of Akron, Ohio.

The sixteen Southern States in an increase of 29 per cent. in 1919 motor vehicle registration over those of 1918 are compared with an average increase of 26 per cent for the whole country.

The steady increase in the Southern States has been due not only to the greater ability of the people of the South to purchase motor vehicles, but in a larger sense to the broader appreciation of the efficiency of motor transporation backed by the construction of a growing mileage of modern highways.

In special articles published in the *Manufacturers Record* it was shown that at least $400,000,000 is available in the South for highway improvements, and plans are being

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made on the basis of State highway systems instead of disjointed sections as constructed heretofore.

All of this means that, great as has been the increase during the past year in modern vehicle registration in the South, there is every reason to look for a still greater expansion in 1920.

The Goodrich count on automobiles and trucks now in operation is based on official figures from every State in the Union. The registration of motor vehicles for 1919 was 7,555,269 and for the year 1918 was 6,023,605, an increase of 1,531,664, a gain of 26 per cent. The increase of 1918 over 1917 was 23 per cent.

All dealer and motorcycle registrations have been carefully deducted. The figures present the first complete authentic report.

The registration by States for both 1918 and 1919 and the percentage of increase in each State follow:

State	1918	1919	Pct. of Increase
Alabama	46,155	62,000	34.3
Arizona	24,875	29,000	21.5
Arkansas	41,458	49,450	19.3
California	337,878	441,101	30.6
Colorado	80,000	112,135	40.2
*Connecticut	84,902	105,419	24.2
Delaware	12,955	15,006	15.8
Florida	47,059	58,263	23.8
*Georgia	99,160	134,826	36.0
*Idaho	32,282	46,852	45.1
Illinois	389,135	478,450	23.0
Indiana	227,160	277,185	22.1
Iowa	285,000	362,000	27.0
Kansas	189,592	228,326	20.4
Kentucky	65,884	87,764	33.2
Louisiana	39,760	50,000	25.8
*Massachusetts	193,497	250,800	29.6
*Michigan	261,527	346,218	32.4
*Maine	44,572	51,354	15.2
*Maryland	78,146	104,353	33.5
*Mississippi	40,000	48,000	20.0
Missouri	187,646	244,167	30.1
Minnesota	203,727	258,719	27.0
Montana	51,050	59,300	16.2
Nebraska	175,370	197,300	12.5
New Hampshire	24,904	30,006	20.5
*New Jersey	154,870	192,000	24.0
New Mexico	16,893	23,150	36.3
Nevada	8,160	9,305	14.0
North Dakota	71,687	72,885	01.7
*New York	457,924	600,000	31.0
*North Carolina	72,300	106,125	46.8
*Ohio	417,400	511,500	22.5
Oklahoma	120,300	151,300	25.8
*Oregon	66,607	79,762	19.8
*Pennsylvania	393,972	414,385	05.2
Rhode Island	30,595	42,000	37.3
South Carolina	55,400	67,981	22.7
*South Dakota	86,121	102,701	19.3
*Tennessee	65,000	80,500	23.8
Texas	256,301	338,100	31.9
Utah	27,204	35,114	29.2
Virginia	74,228	94,100	30.3
Vermont	22,550	26,806	18.9
*Washington	119,905	177,566	48.1
West Virginia	38,600	50,203	30.1
*Wisconsin	196,844	238,360	21.1
Wyoming	16,150	21,372	32.3
	6,023,605	7,555,269	26.0

Note.—* Denotes States in which registration for last few days of December had to be estimated

An analysis of the figures discloses that five States have more automobiles and trucks registered within their individual confines than the entire continent of Europe. These States—New York, Ohio, Illinois, California and Pennsylvania—have a combined registration of 2,445,536—30 per cent. of the entire country's registration.

The State of Washington supersedes Maryland in the distinction of having the largest per cent. of increase. Maryland's 1918 increase over 1917 was 82 per cent., while Washington comes along with a 48 per cent. gain over 1918. North Carolina runs a close second, 47 per cent. in place of its 50 per cent. increase in 1918 over 1917.

The figures reflect that the automobile industry—the third largest in the country—is in an era of almost limitless expansion. It has converted those with pessimistic views of the future of the internal combustion engine as a means of vehicle propulsion into genuine optimists. It has forced nation, State and county to establish good roads building campaigns in equal stride with the trend of motordom.

Jones Motor Co. Fire

On the night of February 18, two buildings, 81 x 252 feet, and their contents, were destroyed by fire at the plant of The Jones Motor Car Co., Wichita, Kansas. These buildings housed the paint department, which had over 100 automobile bodies in process of finishing, and the woodworking section, where another 200 bodies were being constructed.

The direct loss is placed at $200,000, covered by insurance to the extent of about 70 per cent. The assembly department, trim shop and metal working buildings were not injured. That part of the plant is being run by tractor power, some 12 tractors being in use, until a new power plant can be installed.

The fire will curtail the March production to 75 or 100 cars. In April the production is expected to be five cars per day. New buildings are being erected and new machinery is being installed.

Resolution on Death of Ralston C. Ware

At the first monthly meeting following the death of Ralston C. Ware, president of Ware Bros. Company, publishers of THE VEHICLE MONTHLY, the following resolution was adopted by the Carriage, Wagon and Motor Body Builders' Association of Philadelphia, and a copy transmitted to the company of which the late Mr. Ware had been the head:

PHILADELPHIA, February 24, 1920.

MESSRS. WARE BROTHERS COMPANY,
1010 Arch Street, Philadelphia.

GENTLEMEN:

At a meeting of the Carriage, Wagon and Motor Body Builders' Association of Philadelphia, held on Friday, Feb. 20th, it was unanimously resolved:

That in the death of Mr. R. C. Ware we, the Carriage and Wagon Builders and Automobile Body Builders, lose a real friend and ally, one who was always interested in the uplift of our business, and who by his continued counsel and advice during these many years contributed largely to the popularity of the Philadelphia trade, and especially did he add to the influence and benefits derived from the local association, of which he was one of the very first associate members, and the first to promote a spirit of sociability by giving the new organization their first banquet, a feature which has maintained during these past twenty-five years.

His personality was most pleasing, and he was always welcomed in any of our shops because of his invariable purpose to suggest something constructive; something to aid each of us individually and Philadelphia in particular.

To his family and business associates we offer our sympathy, and know that his loss is keenly felt, even as it is by our Association, of which he was an associated member, in fact, but an aggressive member in reality, for the long period of almost twenty-five years.

Believe us, we will all miss him and we join with you and the family in the greatest of griefs.

Yours respectfully,
CARRIAGE, WAGON & MOTOR BODY BUILDERS' ASSN. OF PHILA.
HARRY F. KEACHLINE,
Secretary.

A Philadelphia Body Builder's New Plant

Alex. Wolfington's Son, one of the oldest automobile body manufacturers in Philadelphia, was founded in 1876, of course at that time doing high-class coach work. By a natural evolution they were early in the automobile body trade, building the first limousine body turned out in the city.

For 43 years the firm occupied the buildings at 8-14 North Twentieth Street, and there earned a reputation for quality and service, which has always been linked with the name. In 1918 expansion became imperative and during that year arrangements were made to abandon the old quarters and erect a much larger as well as a more modern building.

The company's new plant on the southeast corner of Nineteenth and Buttonwood Streets is a four-story modern brick building which more than triples the former floor space and productive facilities. Its four large floors provide a total of 55,000 square feet. There is every equipment necessary to the proper building of distinctive automobile bodies, to do repair work, to renovate every part of the car.

The first floor is given over entirely to offices and display rooms. Here is located the new department of motor body accessories, comprising a large variety of articles from vanity cases to lap robes.

On the second floor is the upholstery department where are made new tops and slip covers, and where bodies are reupholstered and provided with repairs to curtains and tops. In a wing of this floor is the blacksmith department. The work of this part of the plant consists of acetylene welding and brazing, metal repairing, and such processes as repairing radiators, fenders, hoods, tanks, drip pans and lamps; re-nickeling and japanning, repairing wire wheels; removing dents of all kinds; welding breaks in metal bodies etc., etc.

On the third floor is the new body and body repair department. Here are built all new bodies as only builders of long experience can construct them. Besides building

(Continued on page 56)

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American Trucks in Near East Relief

(Continued from page 10)

From Derindje supplies for the Armenians in the Caucasus and in Turkish Armenia are sent for part of the way by the Bagdad railway. But this line hits only the centers and the stations off the railroad are reached by a system of motor transport which has been built up amid many difficulties, raids by bandits being one, until it now has a large personnel and equipment, many of the former being officers and men of the American Expeditionary Force in France, who sought further adventure or an opportunity to further aid humanity in the Near East.

Many Dangers Menace Truck Trains

They got both, for motor truck driving in the Caucasus or on the trails of Turkish Armenia not only calls for the same qualities the machine and drivers had to face on the shell-torn roads of France and Belgium, but there is plenty of danger and chances for adventure. Since the demobilization of the Turkish armies, thousands of the former soldiers of the Crescent have turned into bandits. They haunt the roads and food caravans, and to them the motor truck, wagon or camel laden with food or other supplies, are special prizes.

So when the trucks swing out of the branch stations for their trips into the interior, every driver "packs a gun" and the trains have armed guards, some of them former American soldiers, but more often ex-Turkish fighters, all heavily weaponed, picturesquely costumed, and fierce-looking enough to satisfy the most exacting. The bandits, learning wisdom after several disastrous experiences, reluctantly leave the guarded trains severely alone, but woe betide the unguarded train or single truck.

The trains are made up as a rule of from ten or twenty cars. A short haul takes them from Aleppo to Urfa, and a longer one from Mardin takes supplies to the Diarbeker section; Aintab and Marash are served from Aleppo and from Samsoun the food and clothing is sent to Marsovan. These are hard enough but they are nothing compared to big motor truck service operated from the Oulou Kishla on the Bagdad line to Sivas, Caesarea and Harpoot.

From Oulou Kishla the trains, all heavily guarded, are sent out by fifteen or twenties, over "roads" which would be impassable to any but youthful American drivers, roads winding along mountain sides and precipitous passes, up terrifying grades and down steep descents. There isn't a garage or a supply station along the route, there never was, and the trucks carry their own "gas" and repair necessities.

Tires are a big problem. The sharp desert sands and the rough rocks of the mountains make quick work of them. The Near East Relief motor driver has to be a real emergency man, quick on the trigger pull if necessary, used to quick repairs, to handling a wheel under any and all road conditions, and above all imbued with the "get there" spirit.

Hendricks' Commercial Register

The 28th Annual Edition of "Hendricks' Commercial Register" of the United States for Buyers and Sellers for 1920 has just been published, after being delayed for two months by the strike of the printers in New York. It is published by the S. E. Hendricks Company of New York at $12.50. The new edition contains several improvements, the most noticeable being the new method of exterior indexing by coloring the front edge red, white and blue to indicate the different main sections of the book.

First is blue on which is stamped the words "Trades Index." This is a section of 162 pages in which every product listed in the book is indexed and cross-indexed for ready reference. The red section is the main classified trades list. It contains 1813 pages listing over 18,000 different products. In the present edition we find over 1,200 new headings, including many headings completely covering the chemical industry. The third section of the book as indicated by the white edges contains 216 pages, listing the trade names under which products are manufactured, with the name and address of the manufacturer. The second blue section is the alphabetical section of 487 pages containing all the names in the book in one alphabetical list with addresses, and their main line of business. This is followed by the index to advertisers of 20 pages, containing a full list of branch and foreign offices following each name. The whole book makes a volume of 2,703 pages.

It is an excellent work, a copy of which should be in every sales and purchasing department. For the former it contains complete lists of all prospective customers, and for the latter it shows at a glance the producers of any product which may be required. The list of trade headings covers from the raw material to the finished article all products connected with the Electrical, Engineering, Hardware, Iron, Mechanical, Mill, Mining, Quarrying, Chemical, Railroad, Steel, Architectural, Contracting and their kindred industries.

"Hendricks' Commercial Register" has been published annually by the S. E. Hendricks Co., Inc., exclusively for 28 years. The publication of this important reference book, involving a tremendous amount of detail work in compilation and annual revision, places before purchasing agents and sales managers a fund of valuable information not heretofore available.

The Late Franklin Murphy

Hon. Franklin Murphy, ex-Governor of New Jersey, and founder and president of the Murphy Varnish Company, Newark, N. J., died at Palm Beach, Florida, on Tuesday, February 24th. He was an associate member of the Carriage Builders' National Association, and frequently attended the annual conventions.

Mr Murphy was one of the foremost Republican party leaders of his State for many years. Born in Jersey City in 1846, he went to Newark at the age of ten, where he received his education at Newark Academy. At the age of sixteen he volunteered for active service in the Civil War, remaining in the army from July, 1862, until the end of the war.

During his political career Mr. Murphy held many and varied public offices. From 1883 to 1886 he was a member of the Board



The Late Hon. Franklin Murphy

of Aldermen in Newark, and became president of it. He was elected to the State Assembly in 1885. From 1886 to 1889 he was a trustee of the Reform School for Boys at Jamesburg, New Jersey.

Mr. Murphy was a member of the executive committee of the Republican national committee for seventeen years and was a delegate to five Republican national conventions. For twenty years he was chairman of the Republican State committee.

He was married in Newark in 1868 to Janet Colwell, who died in 1904. They had two children, Franklin Murphy, Jr., and Mrs Helen M. Kinney, both of whom are living.

Chicago Vehicle Manufacturers

The Vehicle Manufacturers Association of Chicago held a banquet January 29th at the Lexington Hotel's banquet hall. This was one of the best evenings that the association has ever spent together with their friends. There were about three hundred present.

C. D. Heile acted as toastmaster and entertainment was furnished from the minute that the members and their friends sat down at the table, by high-class entertainers. H. C. Bartruff, who was a friend of Fred L. Meckel's, held the floor for some time and kept the boys in a happy mood telling them stories. H. D. Sayre, secretary of the National Metal Trades Association, gave a very fine talk on the organizing of a national association of vehicle builders.

Everyone seemed to enjoy themselves and felt that the Vehicle Manufacturers Association of Chicago was coming to the front in their line of business and that it would only be the course of a short time when their strength would be felt, as they are getting stronger every day.

The following is a list of the talent that entertained the party: Miss Feral Fairman, vocalist; Brooke and Reese, banjos and songs; Miss Lillian Lenora, songs and dances; Mr. Winslow, piano solos; Blanche and Harvey, comedy and harmony.

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Sedan Body

(Continued from page 29)

pensed with and the start is made from curved line 3, front edge of cowl, to curved line 5 as shown on this draft, because the cowl ends at U on a single point. After these three curved lines 1, 2 and 3, half front elevation, have been established, take distance from A to B on center line, half front elevation, and carry it over to A B, Fig. 1. Point A and center line, half front elevation, is carried over from point U, side elevation. The other three points are obtained from the extreme height of hood on vertical lines 1, 2 and 3, side elevation.

These four lines from A to B are very important, as all curved lines start from there. Take distance on right angular line from points G to H, carry them over from G to H, Fig. 1, and make straight line from point A to point G. Take distance from C D, half front elevation, and carry it over to C D, Fig. 1. Take distance on E F, half front elevation, and carry it over to E F, Fig. 1. The same points which are between A B on center line, half front elevation, are carried over to A B, Fig. 1. The same points between G H, on right angular line, half front elevation, are carried to vertical line G and H, Fig 1. Now make straight lines 2, 3 and 4, which give all the correct spaces between C D, and E F, half front elevation.

Fig. 2 is established as follows: Take distance on base line from Q to E, half front elevation, and put it on Q R, Fig. 2. Make straight line from point Q to point G. Take distance between points O and P, half front elevation, and carry it to points O P, Fig. 2. Take distance between points M and N, half front elevation, and carry it to points M and N, Fig. 2. Take distance between points K and L, half front elevation, and carry it to points K and L. Take points 2, 3, 4 and 5 on base line between Q and R, half front elevation, and put them between Q and R, Fig. 2. The turn-under points M, O and Q, half front elevation, can also be made with the turn-under pattern, as there is no variation with this pattern.

The points are obtained on right angular line, between points G H, half front elevation, in the following manner: Carry point H, half front elevation, over to point H, 1, side elevation. Carry point D D, 3, half front elevation, to point D D, 3, side elevation. Carry point G, between point U and H, on right angular line, half front elevation, to point G, side elevation. Now make straight line from point H, to point D D, and curved line from point D D to point G, and from G to point U. Take square and carry points, intersecting with lines H; D D and U, side elevation, on vertical line 2, 4 and 5, intersecting with angular line G H, and the points 2, 3 and 4 between G and H, Fig. 1 and Fig. 2 are obtained. All other points on angular lines C D, E F, K L, M N, are obtained by the same rule. Same on half bottom view, and all points on all elevations and bottom view correspond with each other on all the three different rules or methods of construction.

Automobile Body Designing

(Continued from page 27)

does not rattle. There are several different ways of doing this, and a few of the fasteners that are in most general use will be described.

In Fig. 104 is shown a bolt and wing nut fastener. The sketch is self-explanatory—to relieve the hood the wing nut is turned up. There is a serious objection to clamping the hood down rigidly because when the car is in service the frame distorts, which tends to throw a great strain on some parts of the hood. The "hook-on" fastener is perhaps the most used type of any at the present time and it is made in several different detail variations.

In Fig. 105 and Fig. 106 are shown two of these types of fasteners. One hooks on to a bracket and the other on to a stud. The principle upon which these work is as follows: When the handle is raised it compresses the spring and the barrel, and the bracket is so set on the hood that the fastener has to be raised to hook it on, and when this is hooked on the tension of the spring tends to pull the hood down and keep it in position.

In Fig. 107 is shown a concealed type of fastener which is a very neat design, as only the handle is visible from the outside. This same handle obviates the necessity of a hood handle for raising the hood. When the fastener is in position it is hooked on to the sill and the spring is composed so that it tends to pull the hood down and hold it securely.

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are great for all rush work. Some shops tell us nearly everybody wants his car turned out overnight. These varnishes don't perform miracles but they are the quickest good varnishes and the best quick varnishes we have ever seen. They will make it possible for any shop using them to turn out more good work and make more money.

Write for Overnight Booklet

Murphy Varnish Company

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Special Advertisements

Advertisements for Help and for Employment, also for the Sale of Machinery, etc., will be inserted in this column, without display type, for 50 cents per line, each insertion (9 words to line). Remittance must be made with order. Copy should be received not later than the 15th of the month, for the next month's issue.

BODY ENGINEER "graduate" will) consider position with a motor car manufacturer as designer and supervisor, also qualified in painting and trimming. Address "909," c/o THE VEHICLE MONTHLY, Philadelphia.

FOR SALE. Quickwork No. 30 Universal Fender wiring machine with six sets of rolls, all in perfect condition. Address "865," care THE VEHICLE MONTHLY, Philadelphia.

FOR SALE. White oak wagon poles, 3 x 4 in. butt, 3 x 3 in. point, 12 ft. lengths. F. F. BOWN MFG. HOUSE, Box 509, Pittsburgh, Pa.

FOR SALE—Elliott Dash Stitching Machine. Address E. R. GAUMER & SONS, Urbana, Ohio.

POSITION WANTED as body layout or pattern foreman. Have had wide experience in body building. A1 mechanic and a hustler. Address "869," care THE VEHICLE MONTHLY, Philadelphia.

POSITION WANTED by expert automobile body builder used to high-grade closed work and with original ideas in design and construction. Has held positions as foreman, draftsman, superintendent, etc. None but reliable concerns having something worth while to offer need reply. Address "906," care THE VEHICLE MONTHLY, Philadelphia.

SUPERINTENDENT OR FACTORY MANAGER.—Practical man familiar with high-grade closed auto body work, capable of handling a large production, is open for position as superintendent or factory manager. Will consider contract work on body building, paint, trimming and final assembly, contract work on complete body or one or more operations on either closed or open bodies. Address "915," care THE VEHICLE MONTHLY, Philadelphia.

SUPERINTENDENT FOR AUTO BODY BUILDING. We want to get in touch with an executive who is thoroughly experienced in mill room and metal work and who is well versed in up-to-date production systems, for position of superintendent in out-of-town body plant. Must be an A1 man and furnish references to prove the same. This is an unusual opportunity and should appeal to the best men in this line. Write fully concerning yourself and state what salary would interest you. Address "855," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—Automobile and car body builders to work on commercial and bus bodies. Good wages to right men. Address "725," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—AUTOMOBILE BODY SUPERINTENDENT.—Largest custom production body plant in the East wants highest grade young man for superintendent and production manager of entire plant. Must be body maker and draftsman by trade and a live wire. Exceptional opportunities and big future for right man with interest in business. Answer giving history of career and all possible information including salary desired. Address "895," care THE VEHICLE MONTHLY, Philadelphia.

WANTED.—First-class carriage or auto body builders, also first-class painter, one who is accustomed to monograms and lettering, also first-class trimmers. ALEX CHRISTIE & CO., 1100 East Pike St., Seattle, Wash.

WANTED AT ONCE.—Experienced body draftsman capable of taking charge of distribution and checking of work on quantity production for a growing organization. Good opportunity. Apply "935," care THE VEHICLE MONTHLY, Philadelphia.

WANTED. Automobile body designer who has had experience with open and closed work. Give full particulars regarding experience. Furnish references and salary in first letter. Address "850," care THE VEHICLE MONTHLY, Philadelphia.

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put on
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the Replacement Spring
IN THE UNITED STATES OF AMERICA
A. D. 1919
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From their stock they replace your weak or broken spring with an exact duplicate of VULCAN quality.
Our name plate is for your protection.
Jenkins Vulcan Spring Co.
RICHMOND, INDIANA
In conducting a persistent national advertising campaign directed to the consumer, our aim is to improve and extend the business of the VULCAN DEALER.
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Atlanta, Ga.
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Dallas, Tex.
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IN EVERY TOWN FOR EVERY CAR
Jenkins VULCAN Spring Co.
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THE more resilient a truck tire is, the harder it is to chip it. The same side vents that make Kelly Caterpillars more resilient, also make them almost impossible to chip.

KELLY-SPRINGFIELD TIRE CO.
New York, N. Y.



KELLY SPRINGFIELD TRUCK TIRES



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The Gramm-Bernstein dealer does not have to waste time in the slow, tortuous process of disarming sales resistance.

He does not have to submit comparisons of price or comparisons of merit.

The Gramm-Bernstein line includes certain exclusive and basic advantages of construction, any one of which justifies its price.

Taken altogether, they set Gramm-Bernstein quite apart from comparison or competition.

The reputation of B. A. Gramm for initiative and constructive improvement in motor transportation dates back twenty years.

His inventive genius is responsible for basic improvements that have long been accepted standards of the industry.

The very last and highest developments of his unique engineering experience are presented in the Gramm-Bernstein truck.

Years of better performance and better service are the biggest selling factors in the Gramm-Bernstein. This is established by the extraordinary percentage of re-orders.

Let us show you how Gramm-Bernstein prestige is continually helping its dealers to easier and more profitable sales.

Gramm-Bernstein Worm-Drive Trucks in 1½, 2, 2½, 3½ and 5-ton capacities, are now sold completely equipped, ready for the body—not an extra to buy.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1154994.

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BEST hickory, air dried and thoroughly seasoned. These are your specifications for spokes and wheel rims.

The reputation of your firm, the performance of your vehicles depends on using best, thoroughly seasoned hickory.

So, in tires it is just as logical, it is just as important for you to specify and use Goodyear Tires.

As logical and as important, because the long life of your vehicles depends *also* on the amount of cushioning secured from the rubber tires.

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They know from experience, know from Goodyear advertising, that Goodyear Carriage Rubber is resilient and comfortable, that it wears a long time.

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Manufacturers of

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Mr. V. M. made the above statement to a prospective customer yesterday, then set the department wheels moving.

It's just another incident where our customers receive the assistance and co-operation of this department manager.

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He will say "yes" or "no" after having had your question passed upon by the best judgment of this organization.

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TAKES no room back of cab, is easy of operation, simple and neat in appearance.

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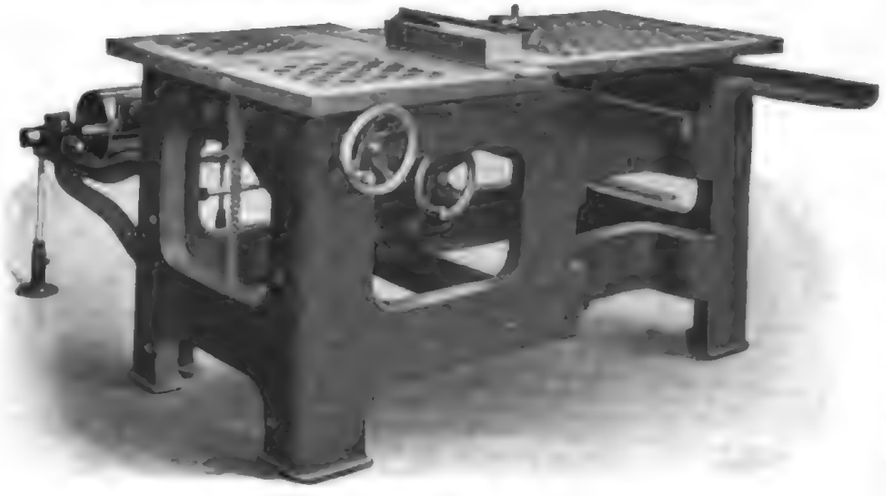
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This Bevel and Mitre Saw is essential in putting your mill on a high speed basis.

Furnished in two sizes

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We Also Manufacture
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Expense of handling is less than on any line our dealers have ever sold.

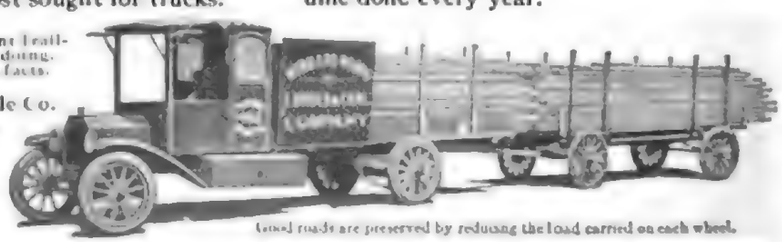
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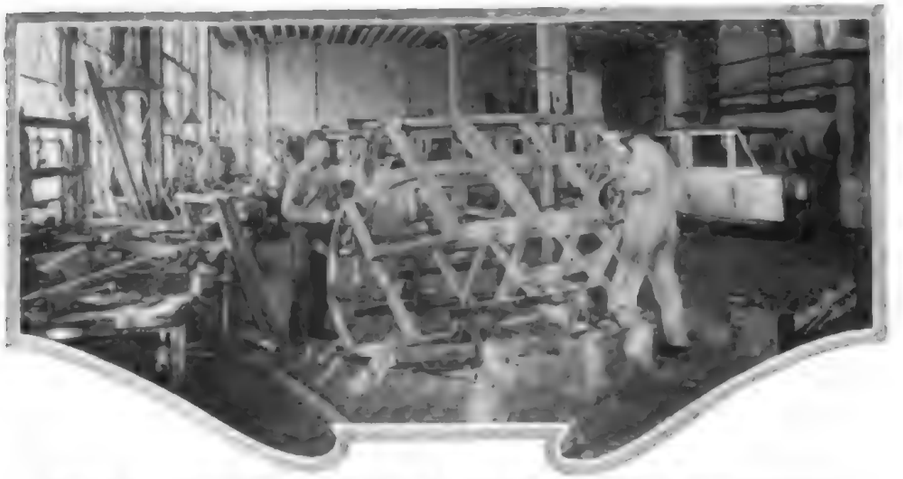
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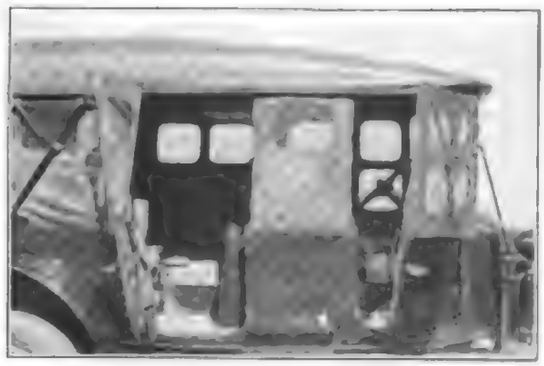
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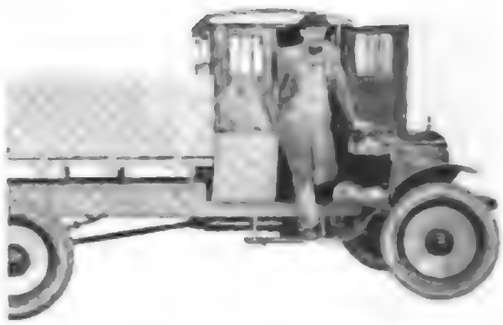
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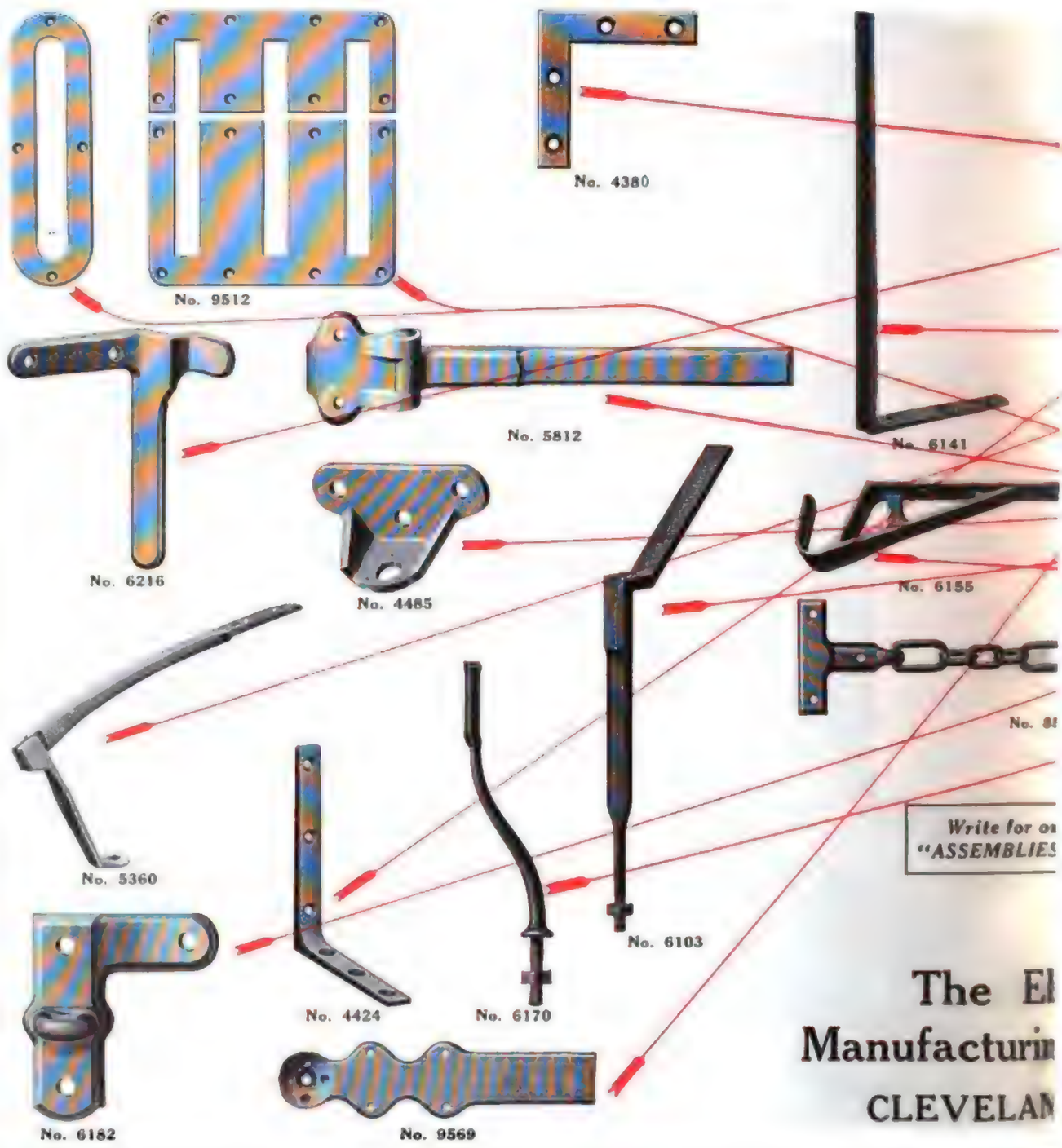
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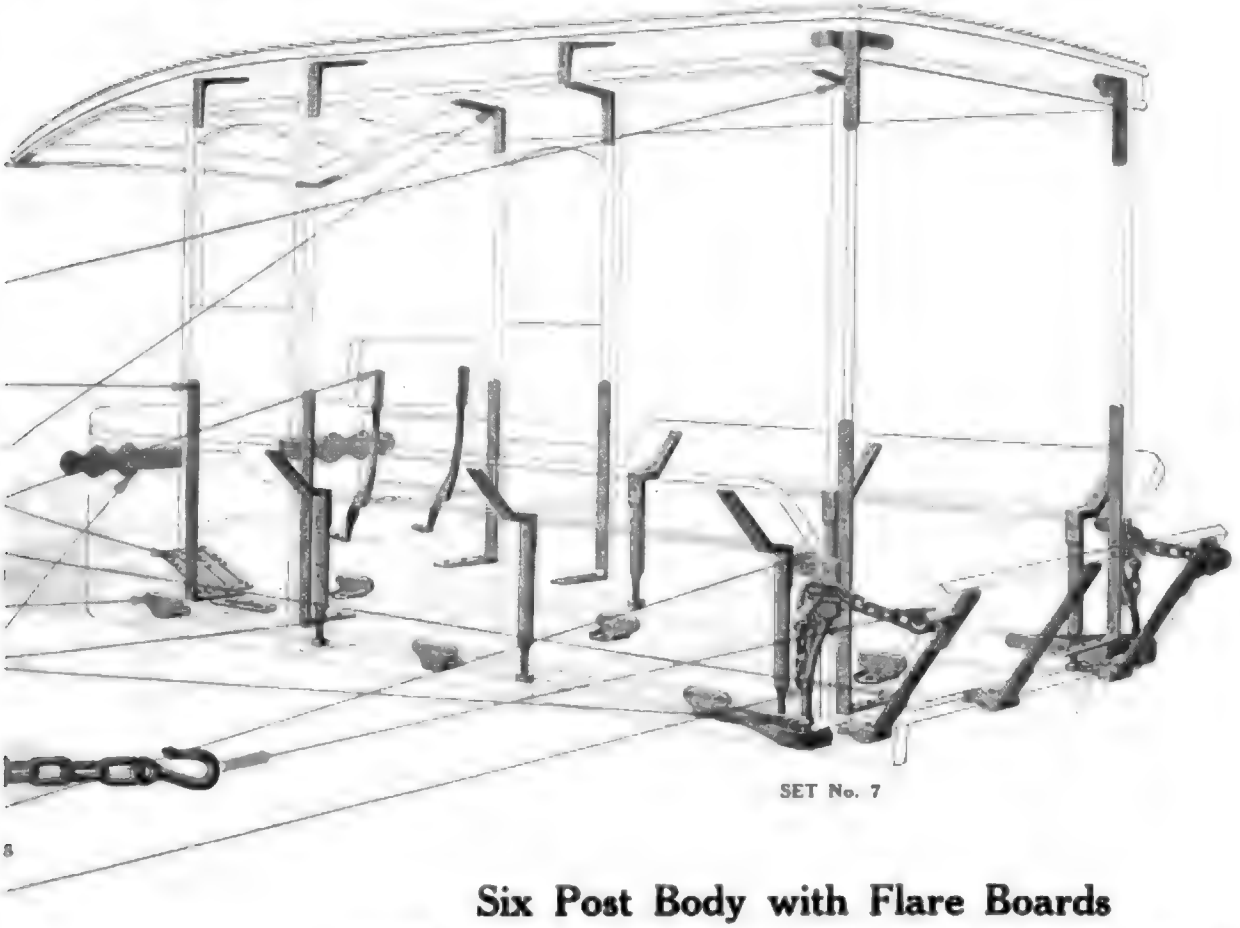
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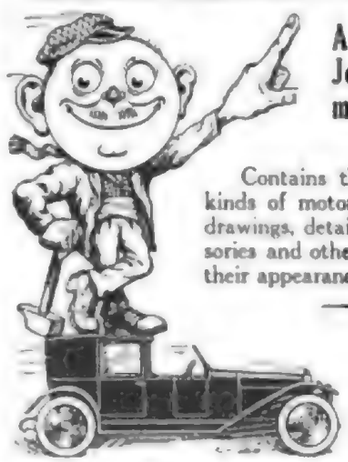
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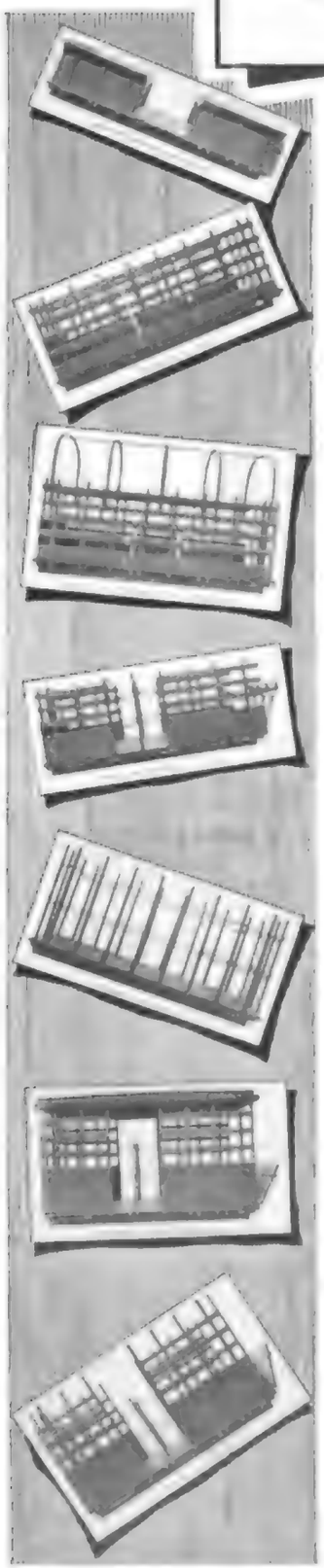
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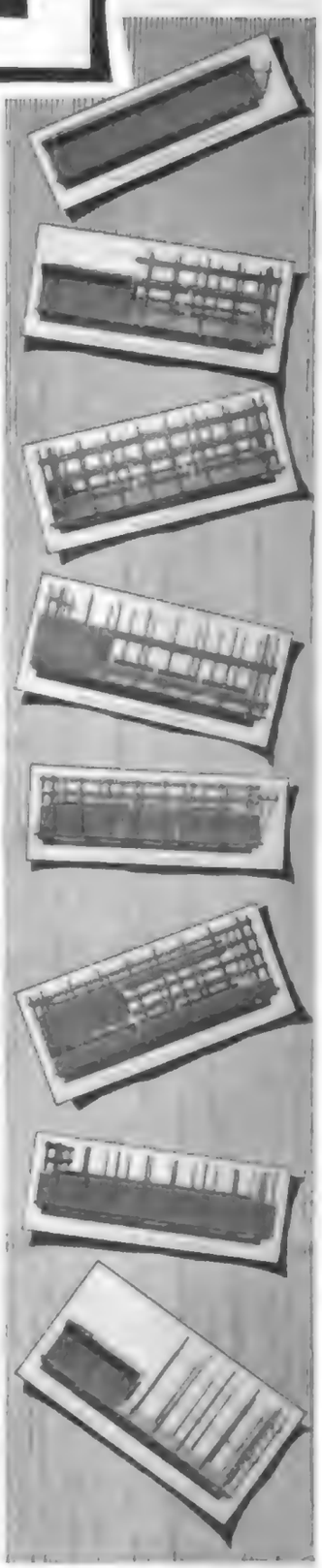
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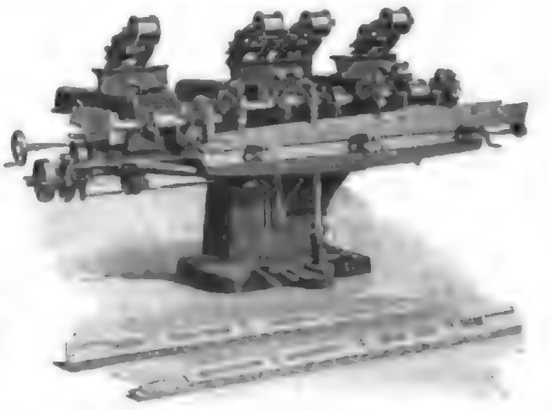
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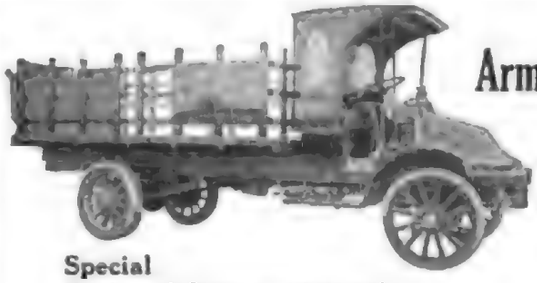
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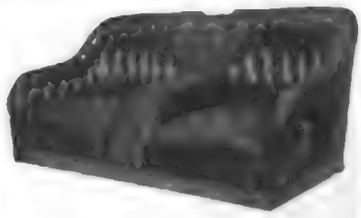


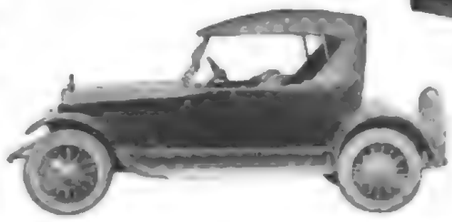
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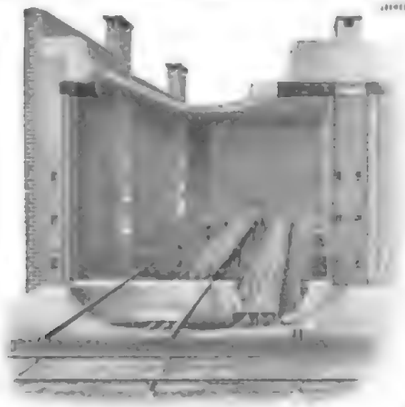
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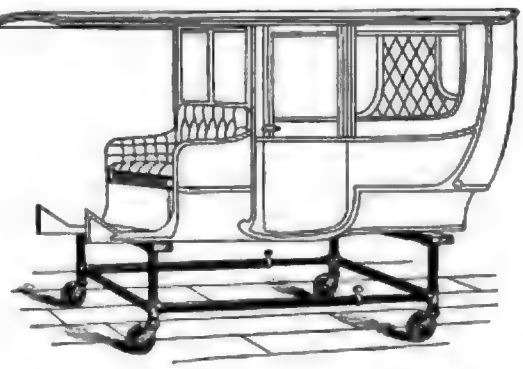
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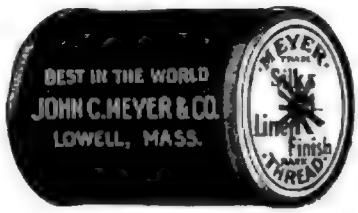
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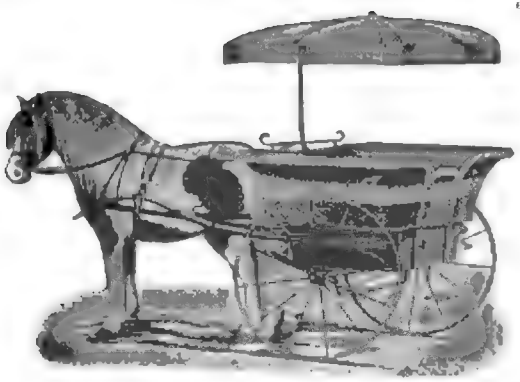
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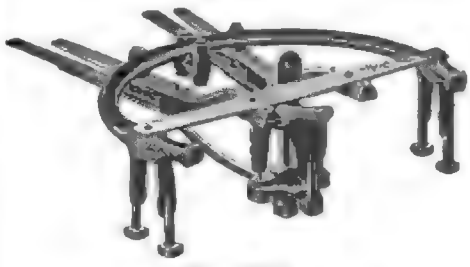
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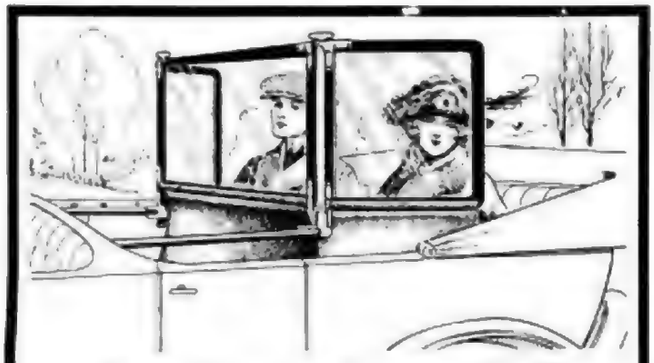
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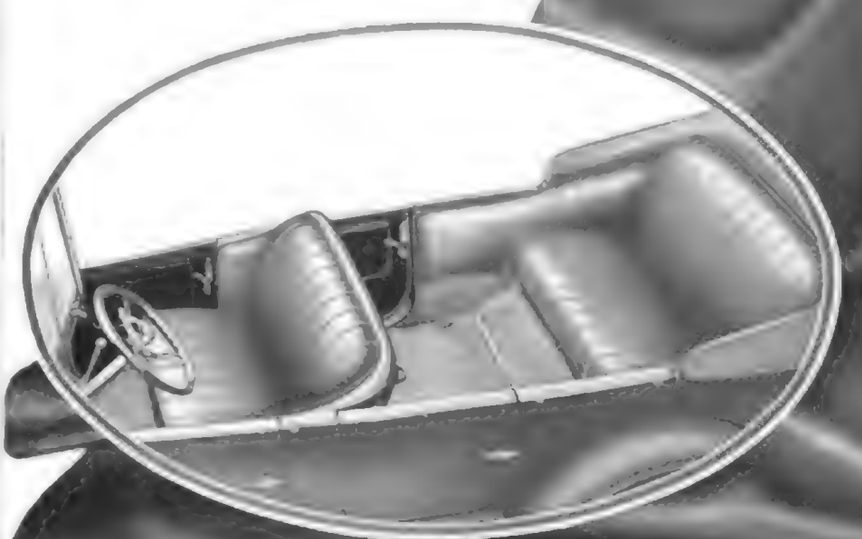
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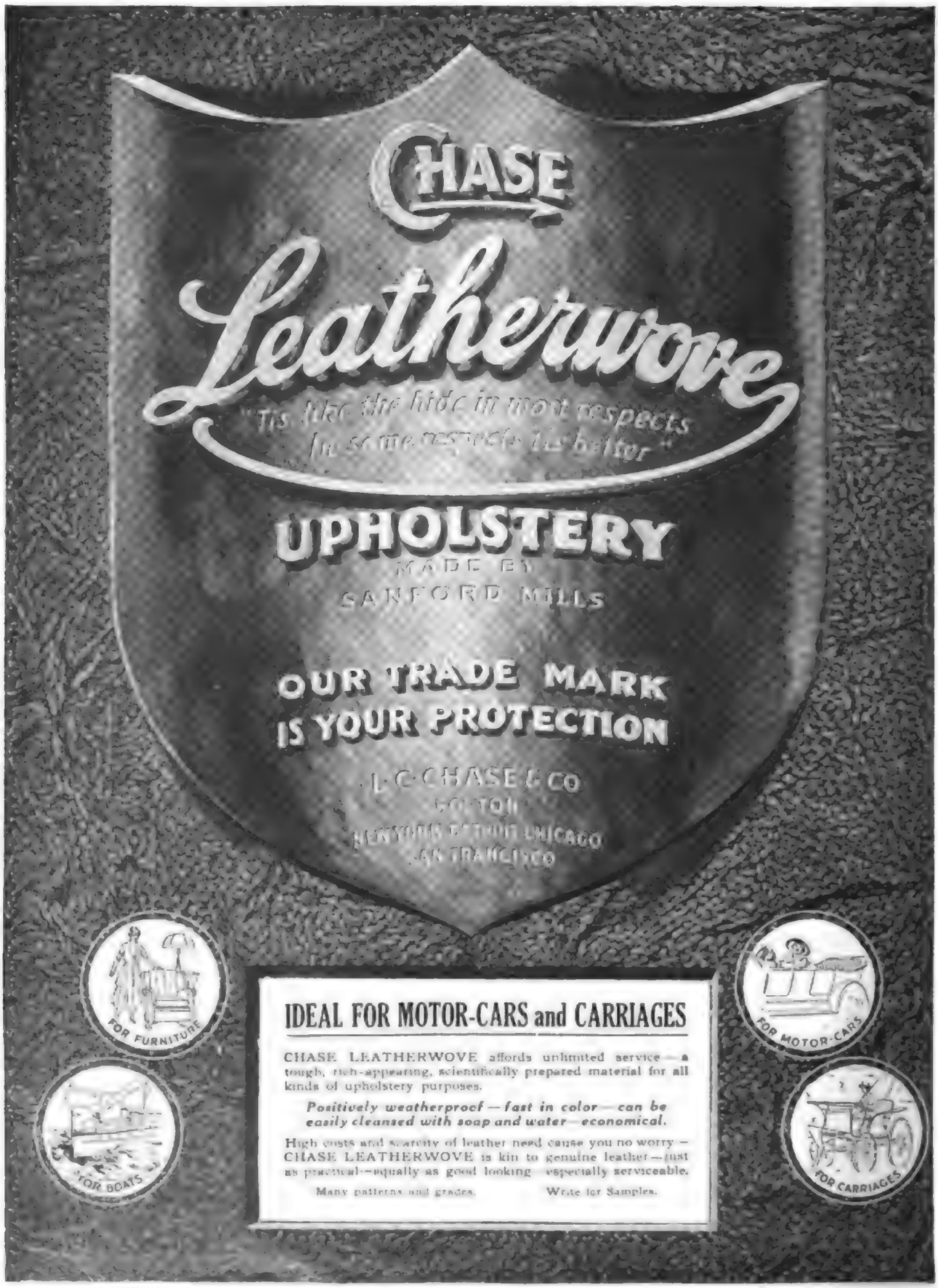
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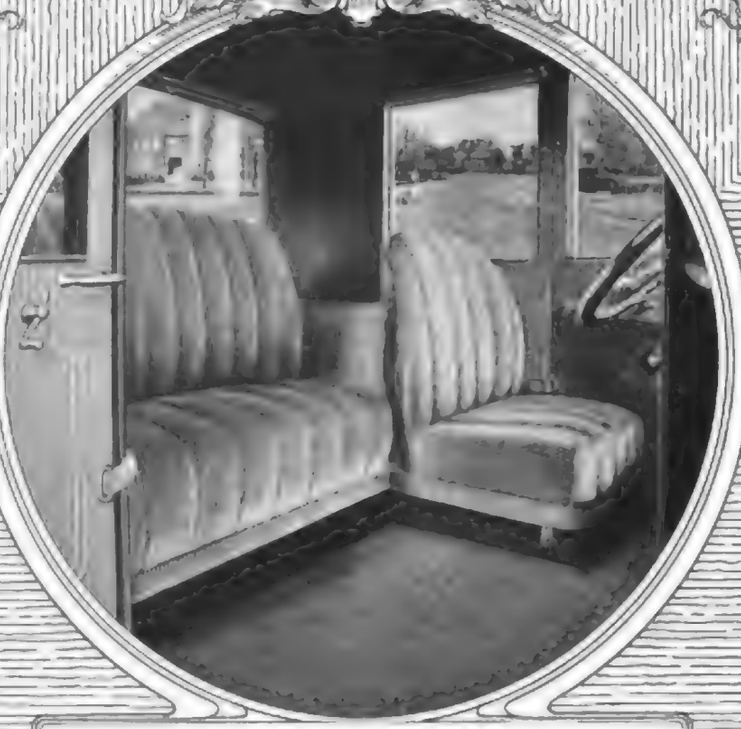
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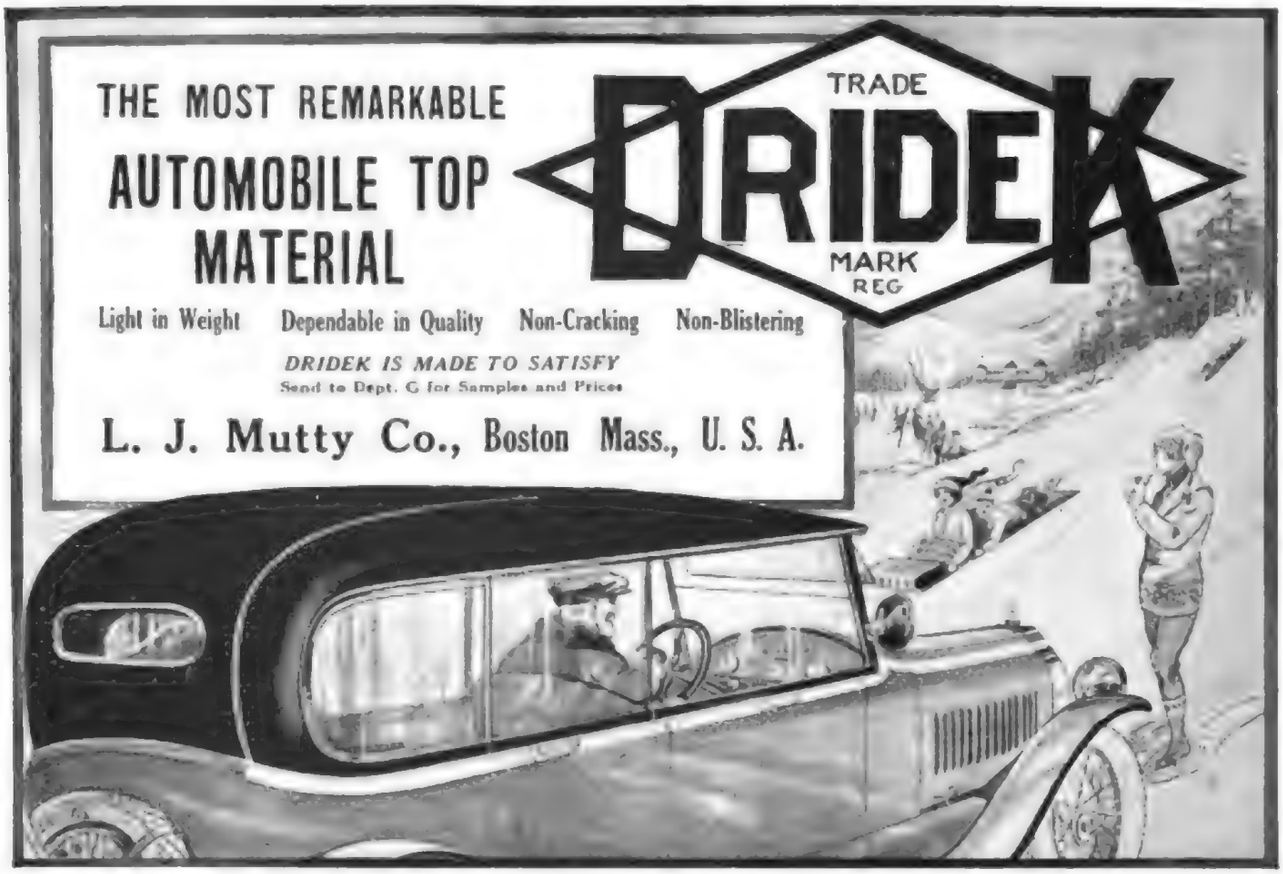
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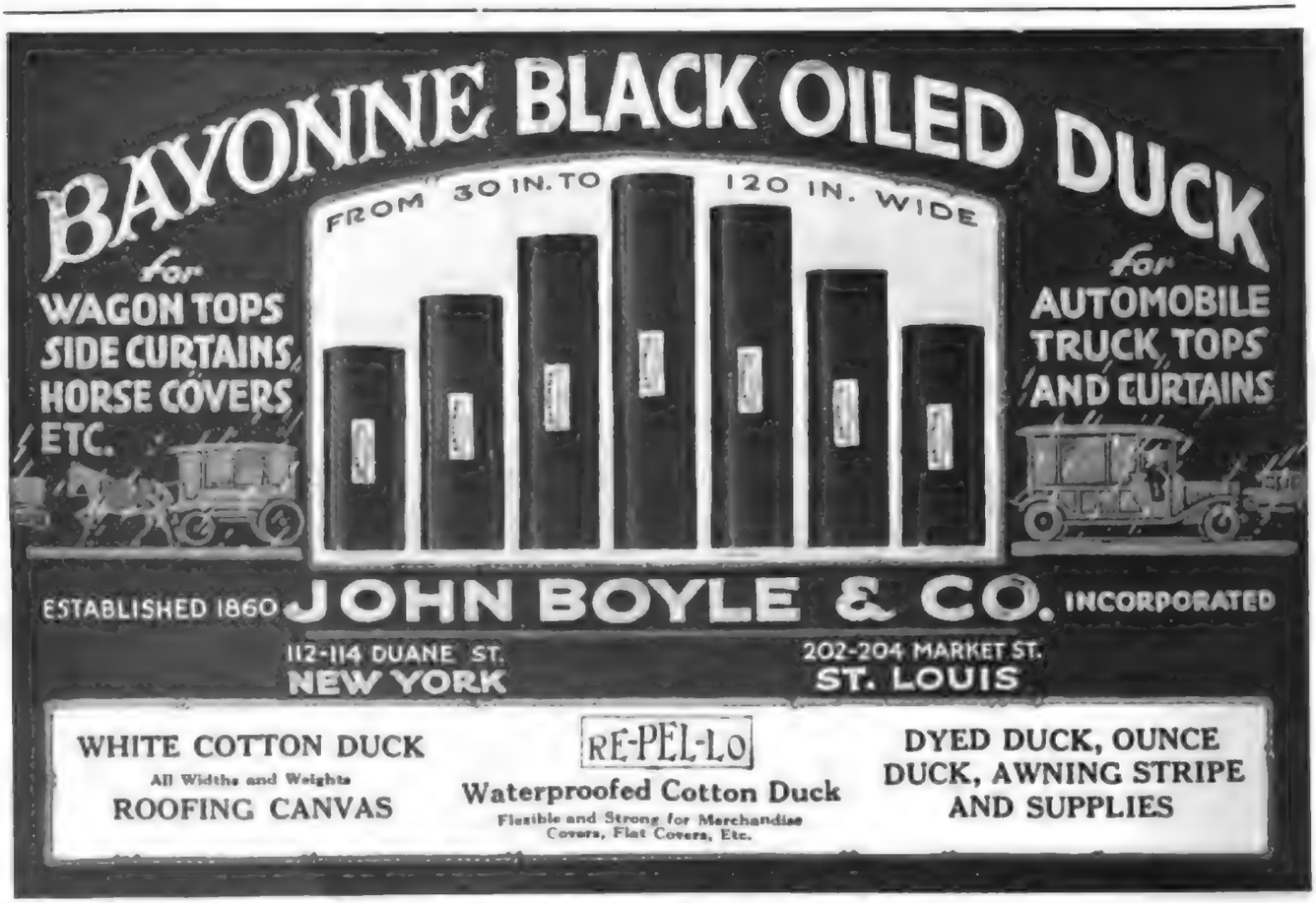
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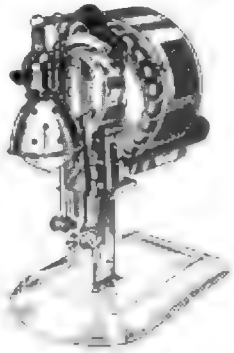
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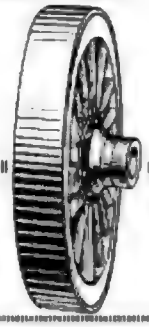
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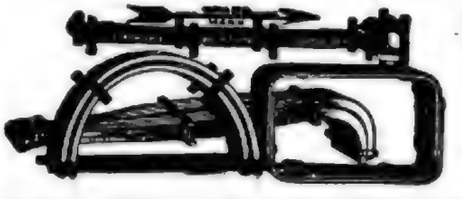
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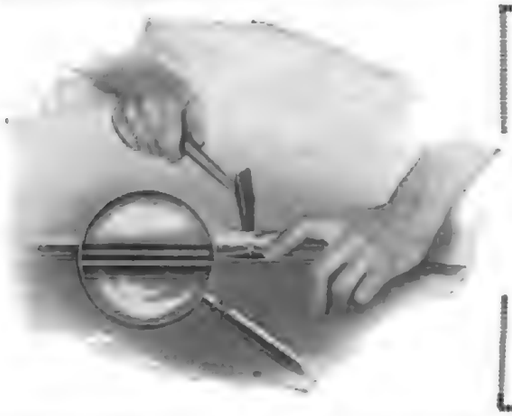
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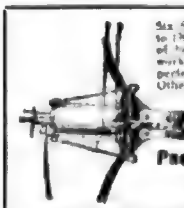
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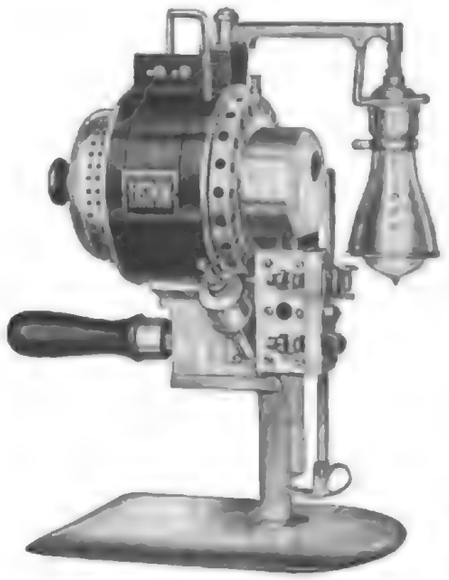
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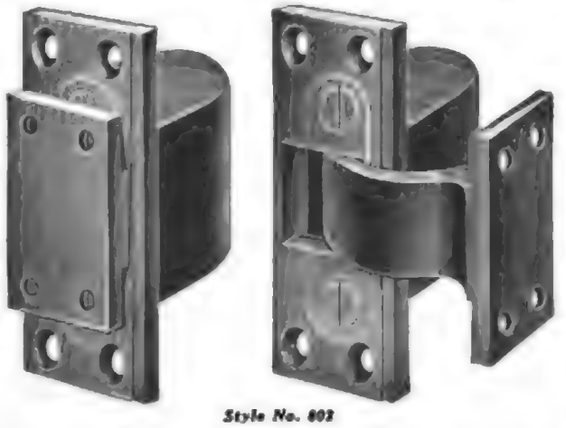
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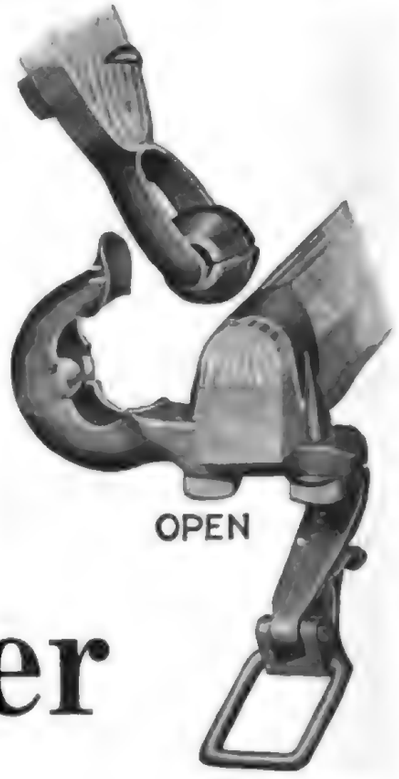
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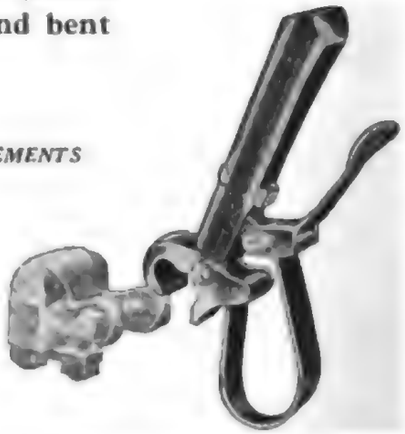
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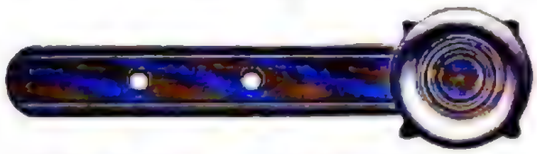
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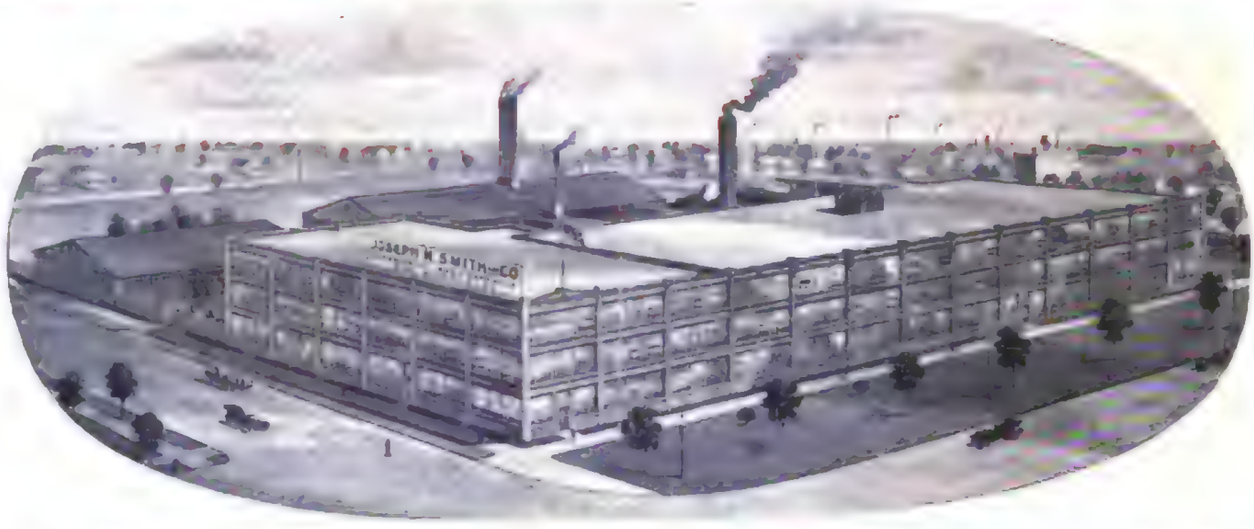
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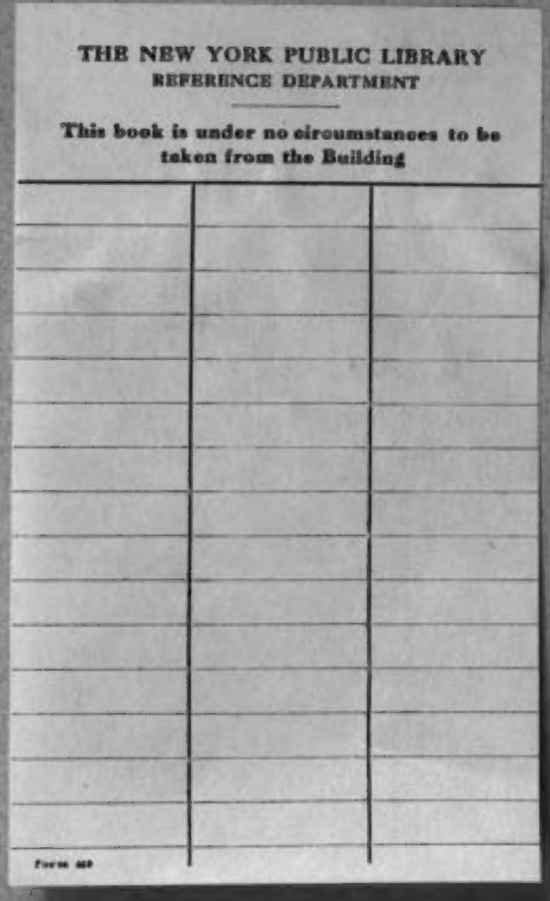
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